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ENCYCLOPÆDIA
OF GENERAL INFORMATION

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MORLAKS—PEVENSEY

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CASSELL'S ENCYCLOPÆDIA.

A STOREHOUSE OF GENERAL INFORMATION.

Morlaks, a people of North Dalmatia, between the Narenta and the Croatian frontier, of Serb (Slav) speech, but said to be of Hun or Ugrian (Bulgarian) descent. Morlak is a contraction of More-Vlakh—*i.e.* Sea-Vlachs—*Vlakh* being the same word as "Wallachian" and applied generally by the Slavs to peoples of Roumanian origin. Their chief occupation is the raising of sheep and cattle. The men are tall and athletic, and play a game of bat and ball which is considered to be a variety of cricket. Two-thirds of the population (150,000) are Roman Catholics, the rest Orthodox Greek.

Morland, George, painter, was born in London on June 26th, 1763. His father, Henry Robert Morland, was a portrait painter of repute. George showed an early talent for drawing, exhibiting at the Royal Academy in an honorary capacity at the age of ten. After a short visit to Paris, he settled at Kensal Green, London, and married a sister of William Ward, the engraver, in July, 1786. He was an extremely prolific painter, producing pictures of animals, country scenes, and—though his own life was dissolute to a degree—several series of moral subjects. In spite of the immense popularity of his works, he was constantly in difficulties with dealers and bailiffs, and died in a sponging-house in Clerkenwell, on October 27th, 1804. He was a good draughtsman, and had a fine sense of composition and colour. As a painter of animals and *genre* he stands in the very highest rank. The "Inside of a Stable," in the National Gallery, London, is one of the most admired examples of his art.

Morland, Sir Samuel, diplomatist and inventor, was born at Sulhamstead-Bannister, Berkshire, in 1625, and was educated at Winchester School and Magdalene College, Cambridge. Supporting the Parliamentary side in the Civil War, he was a member of the embassy to Sweden in 1653 for the purpose of effecting a defensive and offensive alliance. Two years later he was despatched to remonstrate with the Duke of Saxony on the subject of the persecution of the Waldensians, of whose Church he published a history in 1658. After discovering Sir Richard Willis's plot for the assassination of Charles II. and his brother, Morland laboured to promote the Restoration, joining the King at Breda. Charles created him a baronet in July, 1660. Shortly afterwards he devoted him-

self to research and invention in hydrostatics and hydraulics. He became blind in 1692, and died at Hammersmith on January 6th, 1695. He was the inventor of the speaking-trumpet, two arithmetical machines, and the plunger-pump (1674), often wrongly attributed to James Watt, by means of which he raised water from the Thames to the top of Windsor Castle. He was an improver, but not the inventor, of the fire-engine, and seems to have apprehended the use of high-pressed steam as a means of propulsion.

Morley, municipal borough, in the West Riding of Yorkshire, 5 miles S.S.W. of Leeds. The manufactures are chiefly concerned with the woollen cloth trade, coal-mining and stone quarrying. The town owns the gas and water supplies and baths. A public park was presented to the borough by the Earl of Dartmouth in commemoration of Queen Victoria's Jubilee (1887). Morley, which figures in Domesday Book, was the birthplace of Mr. H. H. Asquith, the statesman. Pop. (1901), 23,636.

Morley, Henry, writer, was born in London on September 15th, 1822, and educated at Newwied on the Rhine and King's College, London. For some years he practised as a doctor in Shropshire, and afterwards kept a school, till in 1850 he began his literary career in London. He was connected with Charles Dickens's *Household Words* and afterwards with *All the Year Round* for fifteen years, and edited the *Examiner* for a considerable period. In 1857 he became English lecturer at King's College evening classes, and, in 1865, was appointed professor of the English language and literature in University College, a post which he held till 1890. He also filled a similar chair at Queen's College, and was principal of University Hall, Gordon Square, London, from 1882 to 1890. He was a sympathetic teacher and his industry was enormous. In 1879 the University of Edinburgh conferred upon him its honorary degree of LL.D. He died at Carisbrooke in the Isle of Wight on May 14th, 1894. His chief works were *Palissy the Potter* (1852), *Memoirs of Bartholomew Fair* (1857), *English Writers, First Sketch of English Literature and Early Papers and Some Memories* (1891). He edited *Cassell's National Library*, and the *Library of English Literature*, besides several cheap and useful reprints of classical works.

Morley, JOHN, author and statesman, was born at Blackburn on December 24th, 1838, and educated at Cheltenham and Lincoln College, Oxford. He was called to the bar in 1873, but did not practise. Up to the year 1883 he was almost entirely engaged in literary and journalistic work. He conducted successively the *Literary Gazette*, the *Morning Star*, the *Fortnightly Review* (1867-82), the *Pall Mall Gazette* (1880-83), and *Macmillan's Magazine*, and published several important works, the chief of which were *Burke* (1867), *Voltaire* (1871), *Rousseau* (1873), *On Compromise* (1874), *Diderot and the Encyclopedists* (1878), *Edmund Burke* (1879), *Richard Cobden* (1881), *Aphorisms* (1887), *Walpole* (1888), *Studies in Literature* (1891), *Machiavelli* (1897 Romanes Lecture at Oxford), *Oliver Cromwell* (1900), and *Life of Gladstone* (1903). He also edited the *English Men of Letters* series. After two unsuccessful candidatures, he entered Parliament in 1883 for Newcastle, and in 1886 became Chief Secretary for Ireland, an office to which he was again appointed in 1892. In 1895 he was defeated at Newcastle, but elected for the Montrose Burghs in November of the same year. In 1898 he, with Sir William Harcourt, resigned the duty of "leading the counsels of the Liberal party," but in 1906 he took office under Sir Henry Campbell-Bannerman as Secretary of State for India. Mr. Morley is Hon. LL.D. of the Universities of Glasgow, Cambridge, St. Andrews and Edinburgh, and Hon. D.C.L. of Oxford. He is also F.R.S. and, on the creation of the Order of Merit in 1902, was named one of the original members. In the same year Mr. Andrew Carnegie presented him with Lord Acton's library, and nominated him as one of the administrators of the Carnegie Trust in connection with the Scottish Universities.

Morley, SAMUEL, philanthropist, was born at Hackney on October 15th, 1809. He was educated at private schools, and entered his father's great hosiery business in Wood Street, London, at the age of sixteen. His father retiring in 1840 the concern was carried on by Samuel and his brother John till 1855, when the former became sole proprietor. From early youth he took an active part in religious and charitable work, assisting the temperance cause and building chapels. He contributed £6,000 to the erection of the Memorial Hall in Farringdon Street, London, by which the bicentenary of Nonconformity was signalled; but though an ardent Congregationalist he was always ready to co-operate with other churches and sects in philanthropic effort. Elected M.P. for Nottingham in 1865 he was unseated on petition the following year, but was elected for Bristol in November, 1868, and represented that city till his retirement in 1885. He declined a peerage, and, his health breaking down, died at Hall Place, near Tonbridge, on September 5th, 1886. In 1866 he became principal owner of the *Daily News*, and was instrumental in reducing its price to a penny.

Mormaer, literally "great steward" (from the Gaelic words *mor* and *maer*). The title was formerly given in Scotland to the official placed over a district. At first he usurped the powers of a

petty king, but latterly was more formally invested as hereditary steward with judicial functions. According to the *Book of Deer* he acted as a royal deputy, and in early times retained a third part of the royal revenue and prerogative. On the introduction of feudalism, in the reigns of Alexander I. and David I., the mormaers became earls. Macbeth was Mormaer of Moray. The word is also spelt *maormor*.

Mormons, or LATTER DAY SAINTS, a religious community established in New York State in 1830 by Joseph Smith (1805-1844). After enduring relentless persecution and great hardship they finally settled in Utah in 1847, under Brigham Young (1801-1877), who led them thither from Nauvoo in Illinois. The capital, Salt Lake City, is a thriving town. The most remarkable doctrine of the Mormons was that which sanctioned polygamy. The sect numbers over 300,000 souls, less than half of whom are in Utah. A law condemning the polygamic habits of the Saints was passed by Congress in 1862, but remained a dead letter till 1882. It was then strictly enforced, and in 1890 Wilford Woodruff (1807-1898) formally proclaimed that the church abandoned the doctrine of polygamy.

Morny, CHARLES AUGUSTE LOUIS JOSEPH DUC DE, French statesman, was born at Paris on October 21st, 1811. He was the natural son of Queen Hortense and General de Flahaut, and was thus half-brother to Napoleon III. He was adopted as his son by the Comte de Morny. He served with credit as an officer in Algeria, and afterwards evinced considerable abilities as a financier. In 1842 he became a deputy, and in 1851 was one of the chief contrivers of the *coup d'état*, after which he was nominated Minister of the Interior. He resigned office on account of the decree confiscating the Orleans property, but from 1854 till his death, which took place at Paris on March 10th, 1865, was president of the *Corps Législatif*. Under the pseudonym of "Saint Remy" he wrote several more or less successful operettas and *vaudevilles*.

Morocco, or MAROCCO (a corruption of *Marrâ-kesh*), a country in the north-west of Africa, bounded on the N. by the Mediterranean, on the E. by Algeria, on the S. by the Sahara, and on the W. by the Atlantic as far south as Wad Dria. Approximately it has an area of some 300,000 square miles and a population roughly estimated at 4,000,000, though greatly higher and some lower estimates have been made. The eastern boundary was settled by treaty in 1844, but the southern limits are undefined.

History. Morocco was for several centuries the Roman province known as Mauritania Tingitana. In 533 Belisarius retook it from the Vandals; but a century and a half later the Eastern Empire was deprived of it by the Arabs. At the end of the 17th century, Muley Ismail formed the present Empire. In 1769 the Portuguese evacuated Mazagan; but Spain still holds some places on the coast, Ceuta being the most important; Melilla she had to protect from Moorish fanaticism in 1893. In 1859-60 a war between the two countries ended in the dis-

comfiture of Morocco. There were considerable disturbances in 1903 and rumours of French annexation. The unrest led to the holding of a conference of the Great Powers at Algieras in 1906, which decided that certain coast towns should be policed under French and Spanish control, that the taxation should be revised, and that a State bank should be established in which France was allowed a preponderant voice in consideration of the magnitude of her financial interests in the country.

Physical Features. Morocco is dominated by the Atlas mountains, from which spurs shoot north, west and south-west. Level, almost treeless, plateaus, are found in the centre of the country, and in the south there is desert. The streams are dangerous in the wet season, almost dry at other times, and useless for navigation. The Sebu, however, which flows to the Atlantic, is navigable for boats as far as Fez. The climate in the west is temperate, but in the south extreme. In the north there is a regular rainy season, but in the south little rain falls. In the region round Fez snow and ice are not infrequent. The soil, except in the Saharan regions, is, generally speaking, fertile, and in the west there is good pasturage. Wheat, barley and maize are grown, as well as oranges, figs, lemons, dates and almonds. Tobacco cultivation is prohibited, but cotton and hemp are raised. Several minerals, including gold and copper, are said to be found in the interior; and silver is known to exist at Gondolfi and rock-salt mines occur near Fez. The most characteristic of the animals are the Barbary deer and monkey, the wild cat, and the porcupine. Locusts are all too plentiful, but the Barbary horses have degenerated.

Political and Social Facts. The aboriginal inhabitants are the Berbers, who live in the mountains in a half-savage state. Besides these are the Moors, the Arabs proper, the Negroes, and the Jews. Some Spaniards also live in the towns on the coast. The empire of Morocco consists of the kingdoms of Fez and Morocco, and the territories of Sús and Tafilét. The sultan is absolute, but often has to collect his revenues from the southern tribes by force. The administration of justice is utterly corrupt. All officials are at the mercy of the sultan and indemnify themselves by oppressing their subordinates. The army has been reorganised by Europeans. Education is very backward and printing is unknown. There are no roads worthy the name; but the coast-towns are connected with Spain by telegraph. The chief industries are horse- and mule-breeding, the making of Morocco leather [LEATHER] and Fez caps, carpet-weaving, and some jewellery and metal-working carried on by the Jews. Maize, fruits, cattle, beans, and eggs are exported. The slave-trade continues to flourish in spite of treaties and remonstrances. The sultan resides periodically at Fez, Mequinez, and Marrákesh or Morocco. Chief among the other towns are Tangier, Tetuan, Salée, and Mogador. MOROCCO CITY (pop. about 60,000) is situated in the south-west, about 300 miles from the Mediterranean, nearly 1,500 feet above the sea-level. It is surrounded by a low wall of

"tabia" (earth and lime), five miles in circumference. It has seven gates and towers at regular intervals. Outside are eight large cemeteries. It was once a handsome and flourishing city, but has suffered much at the hands of the Berbers and others. It has a fine situation and a salubrious climate, and a fairly flourishing trade is carried on. There are several thousand Jewish inhabitants and a few European traders. The sultan has a large palace outside the walls, but rarely occupies it.

Moroni, GIOVANNI BATTISTA, Italian painter, was born at Albino, near Bergamo, about 1510, and became a pupil of Il Moretto, the Brescian. Of his portraits—which were animated and truthful—*The*



MORONI: "THE TAILOR."

Tailor, in the National Gallery, London, is his masterpiece. His pictures may be studied at the Brera Gallery, Milan, at Florence, Verona, Dresden, and Munich. He died at Bergamo on February 5th, 1578.

Morpeth, a town in Northumberland, on the Wansbeck, 16 miles north of Newcastle. The principal buildings are the parish church (14th century); the town-hall, designed by Sir John Vanbrugh and restored in 1870; and the King Edward VI. grammar school, rebuilt in 1859. Tanning, flannel-making, iron-founding, and brewing are the chief industries. It has an important market. Morpeth returns one member to Parliament. Pop. (1901), 6,158.

Morpheus, in classical mythology, the god of dreams and son of sleep. The word comes from the Greek and indicates that he was the fashioner of the forms called up before the sleeper. Ovid first mentioned Morpheus, and probably was the author of the personification. In popular speech the word has become a synonym for sleep.

Morphine, or MORPHIA ($C_{17}H_{19}NO_2$), an alkaloid, which was first obtained from opium in 1807. It occurs in many plants of the order Papaveraceae, usually in the form of soluble salts. It is obtained from opium by extracting with warm water and adding lime to the aqueous extract, by which means other alkaloids present are precipitated and the morphine is left in solution. It forms transparent crystals belonging to the rhombic system. It is only slightly soluble in water, but dissolves readily in solutions of alkalis. It acts as a strong base forming salts with acids, as morphine hydrochloride ($C_{17}H_{19}NO \cdot HCl$). It possesses a bitter taste, and in small quantities acts as a narcotic and in larger doses is a poison. It may be recognised by giving an orange colour with nitric acid, and a blue colour with ferric salts, which, however, disappears on addition of acids. Its recognition and estimation in poisoning cases, is, however, generally a matter of considerable difficulty. The hydrochlorate and acetate of this alkaloid are used in medicine, the former being administered in solution (*liquor morphine hydrochloratis*), and made up as a suppository and in the form of lozenges; the latter is also given in solution and is the active ingredient in the *injection morphine hypodermica*—a preparation administered subcutaneously. The hypodermic injection of morphia is a very useful preparation and, by means of it, the soothing influence of morphia upon the system can be produced without any disturbance of digestive processes such as results from the internal administration of opium. Treatment by hypodermic injection of morphia is, however, attended with danger, as a craving for the drug is apt to be induced. This abuse of the employment of morphia has produced in many cases what is known as the "morphia habit." The subject of this condition becomes an absolute slave to the drug, and a peculiar tolerance of its poisonous properties is established, so that large doses can be taken without producing an immediately fatal effect. A state of mental enfeeblement and moral perversion overtakes confirmed victims of the pernicious practice.

Morphology, the science of organic form. The name, originally due to Goethe (1817), has been understood in widely different senses, being used sometimes as synonymous with anatomy sometimes for organography, sometimes for histology, and sometimes for a more purely abstract discussion of form. Ernst Haeckel, in his *Generelle Morphologie* (1866), divides the subject into tectology, the study of organic individuality, and promorphology, the stereometry or crystallography of organisms. Promorphology is the attempt to reduce the complex-curved surfaces of organisms to definite mathematic expression. Two of the most remarkable instances of this are

the laws of phyllotaxis and the law of the logarithmic spiral which governs the curvature of the shells of Gastropoda. The occurrence of comparatively precise geometric form among unicellular organisms has suggested that the excretion of silica to form the shells of diatoms or radiolarians may be determined by centres of vibration and rest in their protoplasm, similar to those in fine dust on a metal plate vibrated by a violin-bow. Morphology may also well be taken to include the discussion of the causes of modification of form, such as mechanical pressure or irritation, hypertrophy, atrophy, cohesion of chorisis, though these border on the provinces of physiology and pathology. The parallelisms of development in related organisms (homology), and in those adapted for similar surroundings (analogy), may also well find a place in this study.

Morphy, PAUL CHARLES, chess-player, was born at New Orleans, Louisiana, United States, on June 22nd, 1837. He was called to the New Orleans bar in 1858, but chess—at which even as a boy he was an adept—monopolised him for many years. After defeating the leading American players, he successfully encountered, in 1858 and 1859, the principal European exponents of the game at London, Birmingham, and Paris. If not the inventor of exhibition games—such as simultaneous play at several boards, blindfold play, considerable odds to all comers—he developed and improved upon these feats with remarkable skill. On his return to his native town he abandoned chess and resumed his legal pursuits. Mental disease, however, set in later, which incapacitated him for all intellectual effort and from which he died on the 10th of July, 1884.

Morris, GEORGE PERKINS, journalist and songwriter, was born at Philadelphia, Pennsylvania, United States, on October 10th, 1802. He was associated with N. P. Willis and T. S. Fay in starting the *New York Mirror* which, with slight change of title, ran to 1844. Two years later he founded the *Home Journal*, which he conducted till a short time before his death in New York on July 6th, 1864. He wrote a novel called *Briercliff* (1825), besides other works, but is chiefly known as a writer of songs, amongst which his "Woodman, spare that tree," inspired by actual experience, attained to universal fame.

Morris, GOUVERNEUR, diplomatist, was born at Morrisania, near New York, United States, on January 31st, 1752. He began to practise as a lawyer in 1771 and took an active part in public affairs before and after the War of Independence. In 1781 he was nominated by Robert Morris as assistant-superintendent of finance. He was one of the framers of the United States Constitution (1787), but was in Europe from 1788 till 1798. He was in Paris during the earlier part of the Revolution, and in England as Washington's agent in 1791. From 1794 to 1798 he was United States Minister at Paris. On his return to America in 1798 he became a United States senator and served till 1803. In 1810 he was appointed chairman of

the New York Canal Commissioners, and acted in that capacity until his death on November 6th, 1816. His *Diary and Letters* are important to the student of the French Revolution.

Morris, SIR LEWIS, poet, was born at Carmarthen, Wales, on January 23rd, 1833. He was educated at Sherborne School and Jesus College, Oxford, where he was Chancellor's Prizeman for English Essay (1858). After practising at the bar till 1861, he devoted himself to poetry, and was knighted in 1895. His chief works are *Songs of Two Worlds* (1872-4-5), *The Epic of Hades* (1876), *Green: a Drama in Monologue* (1879), *The Ode of Life* (1880), *Songs Unsung* (1883), *Songs of Britain* (1887), *A Vision of Saints* (1890), *Songs Without Notes* (1894), *Idylls and Lyrics* (1896), *Harvest Tide* (1901).

Morris, WILLIAM, poet and artist, was born at Walthamstow, Essex, England, on March 24th, 1834, and educated at Marlborough and Exeter College, Oxford. He was afterwards articled to Street, the architect, and made some attempts at painting. In 1858, however, his *Defence of Guinevere and other Poems* showed his true vocation to be that of a poet. It was followed in 1867 by *The*

the Volsung (1876). He also published verse translations of the *Æneid* (1875) and the *Odyssey* (1887), and some prose renderings (with Edward Magnússon) of Icelandic sagas. Chief among his prose works are *A Dream of John Ball* (1888), *A Tale of the House of Wolfings* (1889), *The Roots of the Mountains* (1890), *News from Nowhere* (1891), *The Wood Beyond the World* (1894), and *The Well at the World's End* (1896). In 1861 he founded with D. G. Rossetti, Burne-Jones, and others an establishment for making wall-papers and stained glass; and in 1890 set up the famous Kelmscott Press, for which he designed the type, ornamental letters, and borders. At first an advanced Liberal, he ultimately joined the Socialist movement, and financed one of its organs *The Commonwealth* for a number of years. He died at Hammersmith on October 3rd, 1896.

Morris Dance, a rustic dance, probably of Moorish origin, and perhaps derived from the Spanish morisco or fandango. It became associated with the Robin Hood legend, the actors in which appeared in hoods and gowns ornamented with bells, and the hobby-horse was an invariable feature.

Morrison, GEORGE ERNEST, medical doctor and journalist, was born at Geelong, Victoria, on February 4th, 1862. He was educated at the universities of Melbourne and Edinburgh, at the latter of which he graduated M.D. in 1887. From early manhood he loved adventure. He walked across the Australian continent from the Gulf of Carpentaria in the north to Melbourne in the south (1882-3), and during some exploration in New Guinea in 1883 was speared, the head of the weapon being cut out of his body at Edinburgh in the following year. In 1894 he travelled from Shanghai to Rangoon, a journey of which he published an account in *An Australian in China* (1895). He afterwards became special correspondent for *The Times* at Peking, in which capacity he undertook several missions for which his previous experience had eminently qualified him.

Morrison, ROBERT, Chinese missionary and scholar, was born at Morpeth, Northumberland, England, on January 5th, 1782, and was educated privately and at Highbury College (then Hoxton Academy). In 1807, immediately after his ordination as a Presbyterian minister, he was sent by the London Missionary Society to Macao. In 1809 he was appointed translator to the East India Company and in 1814 translated and printed in Chinese the New Testament. He was afterwards assisted by Dr. William Milne in a Chinese version of the Old Testament, published at Malacca in 1823. His life-work, however, was the *Chinese Dictionary*. After a two years' visit to Europe, he returned to China in 1826, and in 1834 was made interpreter to Lord Napier at Canton, where he died on August 1st, 1834. He received the degree of D.D. from Glasgow University in 1817. Besides the works mentioned, he was author of a *Chinese Grammar*, *Horæ Sinicæ*, and his *Memoirs*. He bequeathed his library to University College, London.



Photo.] WILLIAM MORRIS. [Walker & Boutall.

Life and Death of Jason, and later by his masterpiece, *The Earthly Paradise* (1868-70) and *Sigurd*

Morristown, capital of Morris county, New Jersey, United States, on the Whippany, 32 miles west of New York. The town has iron-works and paper mills. Washington made it his winter headquarters in 1776 and 1779. Pop. (1900), 11,267.

Morris Tube, an inner tube of small calibre which can be temporarily fitted to the barrel of a breech-loading small arm or heavy gun, and from which a diminished bullet can be fired. The use of the tube enables ball practice to be carried on at times, in places, and under conditions which preclude the use of ordinary ammunition and large charges of powder. It effects, moreover, a great saving of expense.

Morse, SAMUEL FINLEY BREESE, painter and inventor, was born at Charlestown, Mass., United States, on April 27th, 1791. He studied art under Washington Allston, whom he accompanied to London, where he attended the Royal Academy



SAMUEL MORSE.

(From photo, by Sarony, N.Y.)

schools. He returned to the United States in 1815, and was instrumental in founding the National Academy of the Arts of Design in 1826, of which he was made first President, a post he filled till 1840. Meanwhile he had become interested in electro-magnetism, and, during a voyage between Havre and New York, the idea of an electric telegraph occurred to him. In 1837 he took out a patent for his electric machine, and in 1844 sent a telegraphic message from Washington to Baltimore. His system soon came into use in America, Germany, and other European countries. Professor Henry, however, disputed with him the priority of the invention, while Sir Charles Wheatstone and others also took out independent patents. Morse also experimented in submarine telegraphy, and in 1857 attempted to lay a cable. He died at New York on April 2nd, 1872. An international gift of 400,000 francs was presented to him in 1858 at the instance of Napoleon III., and his statue in bronze stands in New York.

Morse Alphabet, a device, the invention of S. F. B. Morse, whereby the letters of the alphabet are expressed as combinations of dots and dashes, of short and long flashes of light, or of short and long whistles or other sounds. Originally introduced for telegraphic work, it is now also employed for signalling purposes, especially in the navy, where it is used, particularly by night, as a means for communicating between ship and ship or between a ship and the shore.

Mortality, Bills of. Bill is here used in its old meaning of a presentment or statement of facts. The Bills of Mortality were returns of deaths occurring within a particular district in stated periods of time, specifying the numbers that died of each different disease. In early times the community did not occupy itself too closely with the death of one of its members; and the State's care of the citizen's life was confined to the enquiry by the coroner, a royal officer, as to the cause of death in the case of persons dying by accident, by violence, or in prison. The motive for this enquiry was not so much protection or prevention as to determine whether there might not be some money payment by way of fine or penalty coming to the King out of the occurrence. In the reign of Henry VIII. the first attempt at registration by the State of births, marriages, and deaths was made in 1538 by Thomas Lord Cromwell, then Keeper of the King's Privy Seal, who ordered the ministers and churchwardens in every parish to keep a register of all christenings, weddings, and burials. The order does not seem to have been systematically acted upon, for it was necessary sixty years later to pass an Act of Parliament enjoining the same thing. In this year, 1598, parish registers began to be kept continuously. But already in the beginning of the 16th century, before Cromwell's order, the frequent occurrence of plague had suggested to the well-to-do citizens of London the desirability of knowing, from time to time, in what parishes plague was prevalent, and what parishes were "clear." To this end abstracts of burials and christenings were directed to be compiled in each parish; and persons named "searchers" were appointed by the churchwardens to view the bodies of all that died before they were allowed to be buried, and to certify of what probable disease each individual died. The total deaths, and the number thereof due to the plague, were published in a weekly return or bill. It was for long supposed that these bills of mortality first had their origin in the plague of 1592-4, but there is extant a bill of the year 1535 and one in the Egerton MSS. ascribed to the year 1512, while it is known that even in the reign of Edward IV. the citizens were accustomed to speak of parishes as "clear" or "not clear," i.e. of the plague. Graunt, who wrote in 1661-2, suggested that the citizens of London subscribed to the weekly Bills of Mortality for "no other reason" than curiosity about increase and decrease of burials or rare casualties, "so as they might take the same as a text to talk upon in the next company"; and during plague epidemics, "that so the rich might judge of the necessity of their removal,

and that tradesmen might conjecture what doings they were like to have in their respective dealings." There is, however, little doubt that the latter was the true and sufficient reason. The same writer thus describes the mechanism by which the returns in the London Bills of Mortality were collected: "When anyone dies then either by tolling or ringing of a bell, or by bespeaking of a grave of the sexton, the same is known to the searchers corresponding with the said sexton. The searchers hereupon (who are ancient matrons sworn to their office) repair to the place where the dead corpse lies, and by view of the same, and by other enquiries, they examine by what disease or casualty the corpse died. Hereupon they make their report to the parish clerk, and he, every Tuesday night, carries in an account of all the burials and christenings happening that week to the Clerk of the Hall. On Wednesday, the general account is made up and printed, and on Thursday published and dispersed to the several families who will pay four shillings per annum for it." The searchers received a customary fee of a groat (4d.) for every corpse viewed. The Hall here referred to was the Hall of the Company of Parish Clerks, or "Fraternity of St. Nicholas," in Wood Street, Cheapside, where in 1629 a special printing-press was set up. Similar bills were begun in some other English and Continental cities, but for the most part were allowed to drop, leaving the series incomplete. Those for London, however, continued without a break from 1603 till they were superseded by the more elaborate provisions of the Registration Act of 1836 (6 & 7 Will. IV. c. 86). Graunt discusses the value of the Bills and shows what "corrections upon the perhaps ignorant and careless searchers' reports" were needed; at the same time, as "many of the casualties were but matter of sense," the searchers' reports might be sufficient in all such cases. In many of the more difficult cases "the searchers are able to report the opinion of the physician who was with the patient, as they receive the same from the friends of the defunct." Such were the famous Bills of Mortality. The expression "London within the Bills," meant London as contained by the boundaries of those parishes making these returns. They were, of course, not free from defects. While medical knowledge advanced, the weekly bills remained stationary; interest in them was not maintained by periodic visitations of plague; Dis-senters' burials were not included; and the clerks of many parishes made no returns or only made them irregularly. Even when complete, the bills gave no information about the population of the parishes to which they related. Still they remain a valuable record—in fact, almost the only statistical record of any value of the population of London for over two centuries.

Mortar, a piece of heavy artillery, shorter than a howitzer, designed for throwing shells at high angles, and especially useful for the purpose of bombarding a town, fortress, vessel, or other object, where vertical fire is likely to prove deadly. Mortars of as much as 13 inches' calibre were employed in the 18th century in the navy, and

were generally mounted on platforms in bomb-vessels. They fired spherical shells weighing 195 lbs., with a bursting charge of 7 lbs. of powder. Mortars somewhat longer than those of the ancient pattern are now rifled and breech-loading, and the dividing line between them and howitzers is scarcely maintained.

Mortar, a cement formed by a mixture of lime sand, and water, which is used for cementing the stones, bricks, etc., in building, and for plastering walls, etc. On drying it sets, and in time becomes as hard as, or harder than, the cemented stones, with the formation of calcium carbonate from the lime. If silica is present to the extent of about 12 per cent. the mortar possesses the power of setting under water, and is known as hydraulic cement.

Mortara, EDGAR, a name connected with a typical display, in modern times, of the old autocracy of the Roman Catholic Church. Edgar was a Jewish child who, at the age of 2, had been surreptitiously baptized in the Catholic faith during an illness by Anna Morisi, a devout domestic in the household. Four years later she disclosed the fact to a priest and, on June 23rd, 1858, the boy was abducted from his parents in Bologna by a body of Papal soldiers acting under orders of the Holy Office. When the facts were made public the utmost indignation prevailed throughout Europe, but the Pope declined to surrender the child, pleading that the matter was entirely a spiritual and in no sense a political concern. By the time the temporal power of the Papacy ceased (in 1870) Mortara was old enough to settle the matter for himself, and elected to remain a Catholic and became an Augustinian monk under the name of Pius.

Mortgage, the grant of an estate or other immovable property in fee in security for payment of money, and on the condition that if the money be duly paid, the grant shall be void and the mortgagee shall reconvey the property to the mortgagor.

Mortification (Scots law) is almost synonymous with Mortmain (English law). It is a term applied to gifts of land to a charity (in the widest sense of the term). As a rule, the lands are given to trustees to hold on the charitable trust desired by the donor. A mortification for "behoof of the poor" of a parish or district is held to be for the benefit of persons entitled to parish relief, and falls under the administration of the heritors and kirk-session. The trustees or managers may let out mortified land in lease or in feu if it be for the advantage of the charity. The Court of Session has jurisdiction to change the method of administering a mortification, though it cannot change the objects to be benefited.

Mortification. [GANGRENE.]

Mortimer, de, the surname of an ancient Norman family, whose name is to be found in Domesday Book. They derived their name from Mortema-en-Brai, a castle and township in the Pays de Caux, in Normandy. The first of the name to

be noted was **RALPH DE MORTIMER**, who was one of the lords of the Welsh Marches soon after the Norman Conquest. At the time of Domesday Book his chief seat was the castle of Wigmore. About 1074 the Conqueror granted to Ralph the forfeited estate of Cleobury, thenceforward called Cleobury Mortimer, formerly the property of Edith, wife of King Edward the Confessor. The history of the de Mortimers is typical of that of many noble Anglo-Norman houses. From petty Norman barons they became, by the conquest of England, great, powerful, and wealthy English nobles. For, besides Wigmore and Cleobury, Ralph de Mortimer contrived to obtain the grant of no fewer than fifty manors in Shropshire; and, in addition, he held great estates in nine other counties. These territories, ample as they were, he subsequently extended by pushing out his Welsh neighbours. At first, Ralph de Mortimer was in some sort a vassal of the powerful Earl of Shrewsbury, whom he followed in rebellion against William I. But he was afterwards reconciled to the King, and fought for him in Normandy. In 1087, after William Rufus's death, Ralph supported Henry I. against his elder brother Robert, and was awarded some of the estates of his lord and rival, the Earl of Shrewsbury, who had taken the losing side. Ralph was succeeded by others who continued the policy of consolidating their power and estates on the Welsh border. **HUGH DE MORTIMER** (d. 1181) was either the son or grandson of Ralph. In the troublous times after the death of Henry I. this baron led a life of continual petty warfare. He captured Rhys ap Howell (1145) and blinded him in his prison; but was himself captured and shut up in Mortimer's Tower of Ludlow Castle by another feudal baron, to whom he had to pay a heavy ransom. Besides building several of the castles so bitterly obnoxious to the people of those days, he seized the Royal castle of Bridgnorth; and when Henry II. came to the throne, de Mortimer chose rather to fight than to give up his usurped possession. In the end he was obliged to surrender. Bridgnorth was taken from him, but he was confirmed in his other possessions and privileges. The latter included the privilege of not rendering military service or paying aids and scutages in lieu thereof—an extraordinary concession which meant that the de Mortimers paid practically no taxes. The next two or three barons were undistinguished people; but **ROGER II.** (d. 1282), who succeeded to the title and estates in 1246, acquired by marriage a share of the great March estate of Brecon and the lordship of Radnor, besides other estates in England and Ireland. These acquisitions made the de Mortimers the most powerful house in the West Midlands and one of the greatest in England. In 1258 Roger took sides with Simon de Montfort and the barons against Henry III., but in 1261 he made his peace with, and ever afterwards upheld, the King. The other barons looked on him as a traitor, and he became the best-hated man in the country. After much fighting, and many ups and downs of fortune, Mortimer was worsted by de Montfort and banished to Ireland. But he never went. Instead, he assisted Prince Edward

to escape from de Montfort's custody, and commanded the rearguard at Evesham when the great baron's army was defeated and their leader slain. De Mortimer sent his enemy's head home as a present to Lady de Mortimer. A close friend of Edward I., Roger helped in the conquest of Wales, which was nearly completed when he died, leaving his son **EDMUND** his successor. Edmund enticed Llewellyn, last Prince of Wales, to his death. Edmund was succeeded by a brother, **ROGER III.**, a libertine of great ability, who added to the family possessions the lordship of Chick. This Roger was a skilful warrior who fought in France and Scotland; was one of the guardians of the infant Edward II.; and signed the famous barons' letter to the Pope. Under Edward II. the Mortimers for a long time practically ruled Wales. **ROGER IV.**, nephew of Roger III., became first Earl of March. It was this Mortimer who governed Ireland for Edward II. from 1316 to 1321, and drove out Edward Bruce. He took sides with the barons against Edward II. in 1322, but was captured and sent to the Tower. A bribe to a gaoler procured his escape to Paris, where he met and formed a guilty intimacy with Queen Isabella. On the deposition of Edward II. and the election of the young Edward III., Mortimer and his royal mistress governed the kingdom; but he became insolent and was eventually sentenced by the Lords to death and hanged at Tyburn in 1330. His son, **ROGER V.**, was restored to his father's honours and estates, fought at Crécy, was an original Knight of the Garter, and a good knight and soldier (d. 1360). His son, **EDMUND II.**, succeeded him. He was a popular nobleman, married to Philippa, niece of Edward III. He spent most of his years fighting in Ireland, and died in 1386. **ROGER VI.**, son of Edmund and Philippa, might have succeeded to the crown had he not been killed in battle in Ireland in 1398. **EDMUND IV.**, who became Earl of March and Ulster in 1398, was the last of the male line of the de Mortimers. An attempt was made to place him on the throne by ousting Henry IV., but it failed. He, however, was loyal to the house of Lancaster and fought under Henry V. in France. He died of the plague in 1425.

Mortlake, a parish in the urban district of Barnes, Surrey, on the Thames, 8 miles W. by S. of London, and $1\frac{1}{2}$ miles N.E. of Richmond. Once noted for its tapestry factory, brewing and malting are now the chief industries. It is a popular boating resort and, since 1845, has been the terminus of the University boat-race from Putney, save on three occasions when it was the starting-point (length of course, 4 miles, 2 furlongs). Dr. John Dee, the astrologer, was buried in the parish church, and John Partridge, the almanac maker, in the churchyard, while Sir Richard Burton, the traveller, lies in the Roman Catholic Cemetery. Pop. (1901), 7,774.

Mortmain ("the dead hand") is a term in English law used to describe the ownership of property otherwise than by individuals in private ownership. For a long time a gift of land or money secured in or arising out of land was invalid

if it were made in mortmain. At the present time, gifts of land can be made by will or deed to charities (which includes every public purpose, *e.g.* religion, education, relief of the sick, etc.), provided the deed is irrevocable and the will or deed is executed a year before the death of the donor. Land left by will must not remain in mortmain, but must be sold at most within a year of the testator's death. The object of these provisions is twofold: (1) to prevent the accumulation of land in the hands of charities, and (2) to prevent death-bed gifts of land for religious purposes.

Morton, JAMES DOUGLAS, 4TH EARL OF, was the younger son of Sir George Douglas of Pittendrie, near Lasswade, Edinburghshire, and was born early in the 16th century. He succeeded to the earldom and estates through his wife Elizabeth, daughter of the 3rd Earl of Morton. He joined the Reformers in 1557, and became one of the Lords of the Congregation, and in 1563 was appointed Lord Chancellor of Scotland. He was engaged in the murder of Rizzio (1566), and was cognisant of that of Darnley (1567). He was also present at Carberry Hill (1567) and Langside (1568); and it was he who announced the discovery of the "Casket Letters." For some years after 1572, when he became Regent, he was the most powerful man in Scotland; but he made many enemies, and on June 2nd, 1581, was beheaded in the Grassmarket, Edinburgh, by the "Maiden," a sort of guillotine which he had himself introduced into Scotland, for complicity in Darnley's murder, which he had always denied.

Morton, JOHN, Archbishop of Canterbury and Cardinal, was born at Milborne St. Andrew, Dorsetshire, about 1420. He was educated at Cerne Abbey, a Benedictine house, and Balliol College, Oxford, and practised for some time as an ecclesiastical advocate. Though a Lancastrian, he was made Master of the Rolls (1473) and Bishop of Ely (1479) by Edward IV. He was imprisoned by Richard III., but escaped to Flanders (1483). He was recalled by Henry VII., and in 1486 was made Archbishop of Canterbury, and Lord Chancellor in 1487. He devised the celebrated dilemma known as "Morton's Fork" or "Morton's Crutch," by the application of which no one was able to evade taxation. He died at Knole in Kent on October 12th, 1500.

Morton, JOHN MADDISON, dramatist, son of Thomas Morton, the playwright, was born at Pangbourne, Berkshire, England, on January 3rd, 1811. He was educated in France and Germany and at Charles Richardson's school in Clapham. In 1832 he accepted a clerkship in Chelsea Hospital, but resigned it in 1840 in order to devote himself to the production of farces and pantomimes, of which he was a very prolific author. His most famous piece, *Box and Cox*, was brought out at the Lyceum in 1847. With the decay of farce, Morton's fortunes declined, and, on the nomination of Queen Victoria, he became in 1881 a brother of the Charterhouse, where he died on December 19th, 1891.

Morton, THOMAS, dramatist, was born in Durham, England, about 1764. He entered Lin-

coln's Inn (1784), but was not called to the Bar, preferring to write for the stage. He produced a large number of plays, the most successful of which were *The Way to Get Married* (1796), in which J. S. Munden found his favourite part; *A Cure for the Heartache* (1797), long a stock piece; *Speed the Plough* (1798), in which occurs the famous utterance, "What will Mrs. Grundy say?"; *The Blind Girl* (1801); *The School of Reform* (1805); and *Town and Country* (1807). He died in London on March 28th, 1838.

Morwenstow, or **MOORWINSTOW**, a parish and village on the north coast of Cornwall, England, 6 miles north of Bude. It is chiefly known as the scene of the labours of Robert Stephen Hawker, the poet and antiquary, who became vicar in 1834. The parish church, dedicated to St. Morwenna, is principally Norman. Pop. (1901), 633.

Mosaic Gold. This term is applied to two distinct substances: (1) to an alloy of copper and zinc in equal proportions, and (2) to a golden yellow mass of sulphide of tin, employed as a bronzing powder, and formed by heating a mixture of sulphur, tin-filings and sal-ammoniac.

Mosaic Work, or **MOSAICS** (medieval Greek, *mousaïkos*, "artistic"), inlaid work formed by a collection of small pieces of hard material, especially coloured stone or glass. The most ancient form of mosaic, specimens of which have been obtained from Nineveh and Egypt, was applied to the ornamentation of ivory furniture; in this work small pieces of glass, or lapis lazuli, are placed in holes separated only by thin partitions. At a later date mosaics were used on a much larger scale, especially by the Romans in the construction of tessellated pavements. After a period of decline from the 8th to the 11th century the art revived, reaching its full development in the 13th century, when the beautiful designs in the apse of S. Maria Maggiore, at Rome, were executed by the disciples of Cimabue. In the next century, however, the art fell into neglect owing to the revival of painting and the introduction of frescoes. The making of mosaics is still a successful industry in Italy and France, and, to some extent, also in Russia.

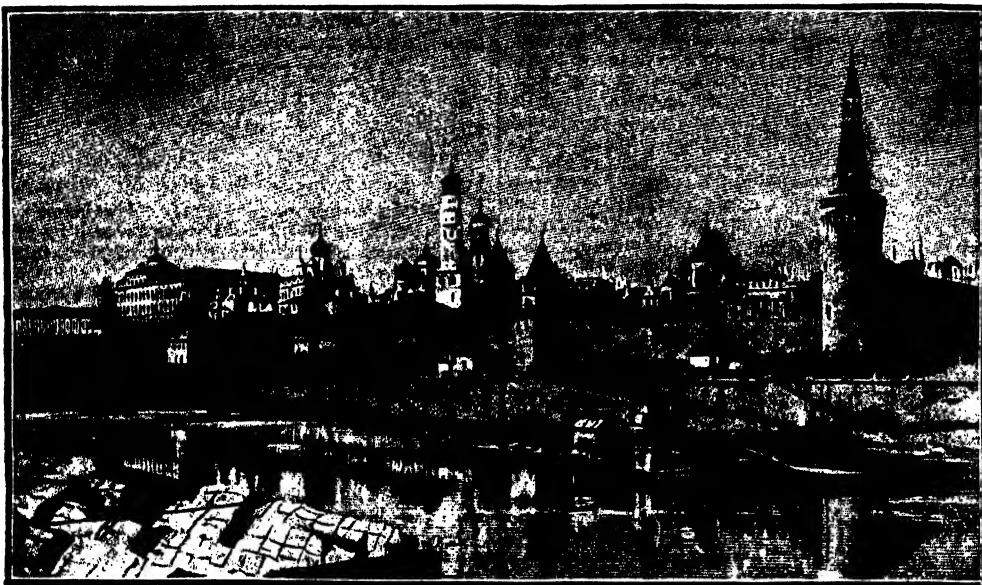
Mosasaurus, a fossil, long-bodied, marine reptile belonging to the order named by Cope Pythonomorphia. Examples have been found in the Cretaceous strata of Europe and the United States. The name records the fact that the first specimen was discovered at Maestricht on the Meuse (Latin, *Mosa*), in 1780. The reptile was 23 feet long and had over 130 vertebrae. The skull is remarkable for the large size of the nasal apertures and the welding of the nasals into one narrow bone.

Mosaylima (**MOSELEMA**), a rival of Mohammed, belonging to a division of the tribe of the Beni Hanifah. He seems to have had some position as a religious teacher before, in the ninth year of the Hegira, he came to confer with the prophet. He afterwards demanded that the latter should share half the earth with him; and Mohammed

appears to have been obliged to purchase his support by conceding some authority to him. He is also said to have nominated him as successor; but, if so, his followers did not fulfil his wishes, for Abu Bekr sent a force against Mosaylima, and a terrible battle ensued (632), in which the latter fell.

Moscheles, IGNAZ, pianist and composer, was born at Prague, Austria, on May 30th, 1794. At the age of fourteen he played one of his own compositions in public, and from 1808 to 1816 he lived in Vienna, where he was on friendly terms with Meyerbeer, Hummel, and Beethoven, whom he assisted in the pianoforte arrangement of the opera of *Fidelio*. With the reputation of the greatest

Moscow, the old capital of Russia and chief town of a government of the same name, stands on high ground on the banks of the Moskwa river, 400 miles south-east of St. Petersburg. While under the rule of the princes of Vladimir in the 13th century it was twice plundered by the Mongols, but afterwards the State grew and prospered, and Ivan III., the Great, who was Grand Duke for forty-three years (1462-1505), assumed the title of Tsar of all Russia. In the 17th century the city was the scene of frequent struggles between the Tsar and the citizens, and later of the rebellions of the Streltzi. The last of Moscow's greater misfortunes was when, in 1812, it was thought necessary to fire the city in view of the advance of the Grand



THE KREMLIN, MOSCOW.

pianist of the day, he undertook a series of tours for several years. For twenty years (1825-1845) he lived in London, where he became connected with the Philharmonic Society; but in 1846, on the invitation of Mendelssohn, he accepted the first pianoforte professorship at the Leipzig Conservatorium. He died at Leipzig on March 10th, 1870. Among his best compositions were *Hommage à Händel* (duet for piano), twenty-four études, and several concertos and sonatas. His only son, FELIX MOSCHELES (born in London in 1833), an artist of repute, was chairman of the International Arbitration and Peace Association.

Moschus, a Greek bucolic poet who lived at Syracuse about 200 B.C. His chief works are the epitaph on Bion of Smyrna, another pastoral poet, two small epics (*Megara* and *Eurypa*), and an epigram styled *Love the Runaway*.

Army of Napoleon. In 1896, during the coronation of Nicholas II., when enormous crowds flocked to the city to witness the festivities, about 2,000 persons of all ages were crushed to death in consequence of defective police arrangements. The city, with suburbs, covers an area of 40 square miles. In the centre, on the left bank of the Moskwa, stands the Kremlin, a fortified space covering 98 acres and surrounded by a high stone wall. It has five gates over which are as many towers. Within the Kremlin stands the Uspensky cathedral, built in the 14th century and subsequently restored. The Arkhangelsk cathedral, erected on an old site in 1505, contains the tombs of the Tsars from 1353 to 1696. The campanile of Ivan Veliki contains some fine bells, and commands a magnificent view of the city. The Great Bell ('Tsar Kolokol, "the King of Bells") of Moscow, nineteen feet in height and weighing 3,960 cwts.,

is close by. It was broken in the fire of 1737 before being hung. Within the Kremlin are the Imperial and other palaces, the arsenal and the Hall of the Synod. An Exchange was built in 1838, and restored in 1873. Moscow is the chief industrial centre in Russia. Besides doing an extensive trade in grain, hemp, and oils, it has numerous cotton-mills and woollen and silk factories. Sugar-refining is largely carried on; and the empire is supplied from it with groceries, tallow, timber, etc. Engineering, building, machinery-making, paper-making, and tanning employ great numbers of operatives, and the trade in books and plain and coloured pictures is conducted on an extraordinary scale. The city is situated at the junction of several important highways and railway systems. The University, founded in 1755, has between 2,000 and 3,000 students, and upwards of 300 teachers. There are also a good technical school, an Oriental institute, an agricultural college, and many other educational institutions. Moscow is rich in museums and scientific societies, among which may be mentioned the Archæological Society (founded 1864) and the Society of the Friends of Natural Science. The principal philanthropic institution is the Foundling Hospital, built in 1764. The Moscow theatres are the best in Russia. The suburbs contain some fine parks. To the north and west are woods and forests, amidst which are monasteries and palaces. Pop. (1902), 1,091,739.

Moselle (German, *Mosel*), a river rising in the Vosges mountains, in France. It flows north-westerly till reaching Toul, after which it bends to the north-east and, after traversing Luxemburg and Rhenish Prussia, enters the Rhine (of which it is a left-hand affluent) at Coblenz. It has a total course of 315 miles, and is navigable from its mouth to Frouard (two-thirds of its length). The Meurthe is the chief tributary on the right, and the Orne on the left. Metz, Thionville, and Trèves are situated on its banks. The country through which it flows is celebrated for its light and delicate wines.

Moser, MARY, flower-painter, daughter of George Michael Moser, the enameller. In 1758 and 1759 she received premiums of five guineas from the Society of Arts, and exhibited with the Society of Artists from 1760 to 1768. She was a favourite of Queen Charlotte, for whom she decorated a room at Frogmore at a fee of over £900. She was made a member of the Royal Academy on its foundation. She and Angelica Kauffmann share the distinction of being the only two women ever elected to the R.A. She exhibited at the Royal Academy up till 1802 chiefly flower paintings, but occasionally classical and historical subjects. On October 26th, 1793, she married Captain Hugh Lloyd, and subsequently only painted as an amateur. She died in London on May 2nd, 1819.

Moses (Heb. *Môshéh* = "drawn"), the law-giver of Israel, lived probably in the 14th century before Christ, and is said to have attained the age of 120 years. According to the Biblical account,

he led his people out of Egypt through the desert, but himself died in sight of the Promised Land, and also gave the law from Mount Sinai and extended and reformed the national system of the Israelites. There are many traditions as to his life in the writings of Philo and Josephus. The Hexateuch (the so-called "Books of Moses" and the early part of the Book of Joshua) was long accepted as his work, but critics now place it, at all events in its present form, many hundred years later than his time.

Mosheim, JOHANN LORENZ VON, German ecclesiastical historian, was born at Lübeck on October 9th, 1694. He studied at the University of Kiel, where he graduated in 1718, and was appointed to the chair of theology at Helmstedt in 1723. After holding this for twenty-four years he became professor and chancellor of the university of Göttingen. His greatest work was the *Institutiones Historiæ Ecclesiasticæ*, finished in 1726, and re-issued in 1755, just before his death at Göttingen on September 9th. In 1832 it was translated into English by Dr. James Murdock. Mosheim wrote other works on theology and Church history.

Mosque, a Mohammedan place of worship. Mosques were originally built in imitation of the Christian basilicas, but in process of time the construction became completely altered. The main building is a square structure surmounted by a dome. In front of the chief gate is a rectangular court surrounded by cloisters, with a fountain for ablution in the centre. Within the domed building numerous lamps are hung, and the whitewash which forms the ordinary covering of the walls is relieved by arabesques and sentences from the Koran, but all representation of men and animals is forbidden. In the south-east stands a pulpit; a niche indicates the direction of Mecca, towards which the faithful turn when they pray. Should women visit a mosque—which, however, is not the usual practice—they are separated from the men. The Moslem removes his shoes before entering. St. Sophia, in Constantinople, is one of the most famous mosques.

Mosquito (dim. of the Spanish *monca*, "a fly," and therefore meaning "a little fly"), an insect of the Culicidæ, or Gnat family, of the Dipterous order. They are distinguished by their long, slender, horny proboscis and their blood-sucking proclivities. Though mostly found in tropical countries they also occur in high latitudes in summer. The presence of water is necessary to their full development and their metamorphosis is perfect. It is certain that some persons are more sensitive to their bites than others, but wherever they are a pest it is usual to protect the bed by "mosquito curtains," for it is only by night that they display activity. It is the female that feasts on blood, trumpeting or humming as she approaches her victim, the male feeding on the nectar of flowers. Sir Patrick Manson's researches have proved that the mosquito is the host of the parasite that causes malaria, and that this disease is propagated in districts where it is prevalent by the bites of the insect.

Mosquito Coast, or **MOSQUITIA**, the Caribbean seaboard of the state of Nicaragua, Central America. The coastland is swampy, and insalubrious, but land is hilly and healthy. The yields most of the products of Indian zone, especially mahogany and other valuable

low-lying, the hinter-fertile soil the West

lar spore, on germinating, gives rise to a green filamentous, branching protonema, on which arise lateral buds, which grow into the leafy shoots. The stem generally terminates in a three-sided, pyramidal, apical cell: its outer cells are thickened into a red or yellow epidermal layer; and in some



MOSQUE OF ST. SOPHIA, CONSTANTINOPLE.

(Photo: Abdullah Frères, Constantinople.)

economic trees. The Mosquitoes are half-breeds of Indian and African blood, a hardy race who are still ruled by their own chief. The territory was discovered by Columbus in 1502, was the haunt of the buccaneers, and from the middle of the 17th century till 1850 belonged to Great Britain, which then—under the Clayton-Bulwer treaty—resigned all claims to it and, ten years later, by the treaty of Managua, recognised the protectorate of Nicaragua. In 1894, at the wish of the Indians, Mosquitia (or the Mosquito Reserve, as it had also come to be styled) was constituted as the department of Zelaya (pop. 15,000). The chief town is Bluefields (pop. 5,000).

Mossamedes, a district of Portuguese West Africa. The principal rivers are the Kunene, Kubango, Kwito, and Kwango, and the chief coast indentations are Great Fish or Tiger Bay and Little Fish Bay. The products mainly comprise cotton, indiarubber, coffee, gums, and archil (lichens that yield a rich violet, mauve, or purple dye), but cattle, fish, spirits, hides, and ivory are also exported. The leading town, of the same name, a seaport situated on the southern arm of Little Fish Bay, serves as a sanatorium to the great province of Angola. Pop. 6,000.

Mosses (*Musi*), the higher class of the sub-kingdom Bryophyta, are lowly plants, found in many situations, but most abundant in damp places in temperate climates. The green unicellu-

lar spore, on germinating, gives rise to a green filamentous, branching protonema, on which arise lateral buds, which grow into the leafy shoots. The stem generally terminates in a three-sided, pyramidal, apical cell: its outer cells are thickened into a red or yellow epidermal layer; and in some cases there is also an axial, rudimentary "vascular bundle" of elongated cells. The numerous small, spirally arranged leaves are mostly a single layer of cells; but there is a thicker midrib, sometimes produced into an awn, and having its cells continuous with those of the axial bundle. Bog-moss and *Leucobryum* are exceptional in having a system of large, empty, perforated cells, acting as a capillary water-conducting apparatus, both outside the epidermis of their stems and in their leaves, giving the plant a light-greyish aspect. Mosses generally put out numerous rhizoids or root-hairs, differing from protonema in being colourless and growing downwards. Branches generally originate beneath the leaves and, becoming detached by the decay of their bases, serve to reproduce the plant, and are called innovations. Gemmae, or multicellular bud-like bodies, are frequently borne by mosses, sometimes in a distinct receptacle or cupule, and reproduce the plant asexually. The sexual organs are commonly surrounded by a rosette of leaves termed perichaetial, and thus form what is called a flower, which may be bisexual, monocious, or dioecious, and contains barren cell-filaments or paraphyses, in addition to the archegonia and antheridia, assisting fertilisation by retaining drops of water. Mosses are divided into *Acrocarpi* and *Pleurocarpi*, according as the apical cell of the main stem or that of a side-branch gives rise to the archegonium. Mosses are divided into four well-marked orders, *Sphagnaceæ*, *Andreaeaceæ*, *Phascaceæ*, and *Bryaceæ*.

Sphagnaceæ, the bog-mosses, have globular red capsules, with a very short seta, but a long stalk or pseudopodium below it, belonging to the oophore stage. There is a small convex lid or operculum to the capsule, and within there is a globular mass of tissue or columella, in the upper part of which spores of two sizes (megaspores and microspores) originate. The **Andreaeaceæ**, containing only the genus *Andreaea*, have no operculum, the capsule otherwise resembling that of bog-mosses, but bursting by longitudinal splits. **Phascaceæ**, also a small order, approximating in some points to the liverworts, have a sprange which decays without bursting. **Bryaceæ**, the largest and highest order, have a pointed operculum, below which is an annulus or ring of hygroscopic cells. There are commonly stomata on the lower part of the capsule, and there is an axial columella throughout its interior. The spore-bearing tissue surrounds this column and is separated from the outer walls of the capsule by an air-cavity crossed by rows (trabeculae) of green cells. Generally, when the operculum falls, the mouth of the capsule is seen to be surrounded by one or two rows of teeth-like bodies (peristome) which are much used in discriminating genera.

Mostaganem, a town of Algeria, in the department of Oran, North Africa. It lies on a plateau, 270 feet high, on the Mediterranean coast, 43 miles E.N.E. of Oran. The chief exports are grain, wool, hides, figs and grapes. In spite of a continuously heavy outlay to improve it, the harbour is only of moderate capacity. There is a railway inland as far as Tiarret. Pop. 15,000, of whom more than one-third are Europeans.

Mosul, a town in the province of Al Jezireh, Turkey in Asia, on the right bank of the Tigris, opposite the ruins of Nineveh. In the 9th century it was a flourishing trading city, and had previously been a great Christian centre. It was occupied successively by the Mongols, the Seljuks, and the Turks, and has long been in a declining state. A memorial of its more prosperous industrial days survives in the word "muslin," so named because it first came from Mosul. Pop. 40,000, of whom fully three-fourths are Moslems.

Mote-hill, or MOOT-HILL, means a hill of meeting. The Anglo-Saxons were in the habit of holding their moots (see FOLKMOOT) in the open-air when no convenient hall, of sufficient size to accommodate all the freemen entitled to take part in the proceedings, was available, which was seldom the case. It was usual to select, for the place of such an open-air court, a hill or rising ground; which, becoming the customary place of meeting, came to be called the "mote-hill." It was in these open councils that the Anglo-Saxons cultivated the art of debate, settled matters of local government, tried civil and criminal causes, and laid the foundations of the Parliamentary system.

Motett. (1) A sacred cantata, comprising various unconnected movements. (2) A choral composition, usually sacred, in which the intro-

duction, resembling a song in form, is followed by fugue subjects, with their expositions.

Mother Carey's Chicken, the sailor's name for the Stormy Petrel, the Great Black Petrel being called, from its size, Mother Carey's Goose. "Mother Carey" is said to be a corruption of *mater cara*.

Motherwell, a town of Lanarkshire, Scotland, near the South Calder, a tributary of the Clyde, 12½ miles E.S.E. of Glasgow. It has great iron, steel and engineering works, and coal-mining is also carried on. Owing to its position in a rich mineral field it has developed with remarkable rapidity. Only 726 in 1841, its population in 1901 had reached the amazing figure of 30,418.

Motherwell, WILLIAM, poet, was born in Glasgow, Scotland, on October 13th, 1797. He was educated at Edinburgh and Paisley and attended Glasgow University for a year. From 1819 to 1829 he was employed in a lawyer's office in Paisley, but followed literature in his leisure time. In 1819 he edited the *Harp of Renfrewshire*, a collection of minor local verse, and in 1827 published his most important work, *Minstrelsy Ancient and Modern*, to which he contributed several beautiful ballads, and which brought him into communication with Sir Walter Scott. He left Paisley in 1830 to undertake the editorship of the *Glasgow Courier*, and two years later, issued *Poems Narrative and Lyrical*, a selection of his best metrical work. He died in Glasgow, of apoplexy, on November 1st, 1835.

Moths, the name given to those insects belonging to the group Heterocera, one of the two sub-divisions of the order Lepidoptera. The classification is at present somewhat unsatisfactory, but they may be divided into 5 sub-sections and about 120 families. The *Sphingæ* (Hawk-moths), the *Bombycæ* (containing the Tiger-moths and Silkworms), the *Noctuæ* (containing the Cabbage-moths), the *Geometræ* (with the Swallow-tailed moth), and the *Microlepidoptera* (of which the Clothes-moth is a type), form the sub-sections.

Motion may be of two kinds. If a body moves from one position to another in a straight line, it is said to have a motion of translation; if it moves round a fixed point, it is said to have a motion of rotation. However complex the motion of a body may appear to be, it can always be shown to be a combination of these forms. When a body moves through equal distances in equal times, its motion is said to be uniform; but if it gains or loses speed, its motion is variable, and the speed gained in unit time is called its acceleration. Thus, if a body is moving with a speed of 44 feet per second and during one second increases from 44 to 50 feet per second, it has an acceleration of six feet per second. We can only consider relative motion, for we know nothing about the absolute motions of bodies in space. In saying that a train moves at the rate of 30 miles an hour, we are merely comparing its speed with that of the places it passes on the earth, and we entirely neglect the earth's motion

round her axis or round the sun, which motion belongs alike to the train and the places on its route. Newton enunciated three laws of motion :— (1) Every body remains in a state of rest or of uniform motion in a straight line, unless it is compelled by impressed forces to change that state. This is equivalent to saying that matter has inertia; it cannot, by itself, change its state of motion. (2) Change of motion is proportional to the impressed force, and takes place in the direction of the straight line in which the force acts. From this it at once follows that when several forces act on a body, each produces the same effect as if it acted alone, and this effect is produced whether the body be already in motion or at rest. (3) Action and reaction are equal and opposite, or the mutual actions between any two bodies are always equal in magnitude, but oppositely directed in the same straight line. Thus, the tension of a rope is the same throughout its length; it exerts, for instance, as great a pull on the towing-line as on the boat which is towed. The action and reaction can be expressed as the work done by a force; hence, we arrive at the principle of "natural work" and its application to machines. The third law may further be regarded as the first enunciation of the principle of the indestructibility or conservation of energy.

Motley, JOHN LOTHROP, American historian, was born at Dorchester, Mass., on April 15th, 1814, and was educated at Harvard, where he graduated in 1831, and the Universities of Göttingen and Berlin. In 1837 Motley was married, and two years later published *Morton's Hope*, a historical novel. In 1856 he made his reputation by his *History of the Dutch Republic*, which had taken him ten years to prepare. It was followed (1860-8) by the *History of the United Netherlands* and by *The Life and Death of John Barneveld*. During the Civil War Motley wrote some interesting letters to *The Times* on the side of freedom and the North. He was United States minister at Vienna from 1861 to 1867, and in 1869 was appointed to London, but was recalled almost immediately on account of his friendship with Sumner, with whom President Grant had quarrelled. He died at Kingston Russell, his son-in-law, Sir William Vernon Harcourt's place in Dorsetshire, on May 29th, 1877.

Motor-Cars.—The motor-car is a mechanically-propelled vehicle containing its own source of power. The term is almost self-explanatory, as is also the equally common word "automobile," which is a compound of a Greek word meaning "self" and a Latin word meaning "moving." The history of the automobile goes back, it is certain, as far as the year 1619, when a patent granted to Ramsay and Wildgoose had as part of its subject "drawing carts without horses." However, attempts to produce a mechanically-propelled road vehicle had been made prior to that date. It is known that carts had been propelled by wind power in the Netherlands. The early history of the automobile is almost wholly confined to the steam car, the credit for the successful invention of which is generally accorded to Nicholas Joseph Cugnot, a

Frenchman who, in 1769, constructed a steam trolley, and in the following year a steam gun-carriage, a *facsimile* of which was for some years on view at the Conservatoire des Arts et Métiers, at Paris. This gun-carriage had two wheels at the back and one in front; a boiler, 4 ft. 2 in. in diameter, carried in advance of the front wheel, supplied steam to two upright cylinders containing pistons, whose movements were transmitted to the driving axle of the single front wheel through a complication of ratchet wheels, rods, arms, and pawls. This gun-carriage was quite a success in its way, but its steering gear was faulty, and it is believed to have ended its life in a collision with a wall. Many inventions are reported before this, but their success is open to question. A dubious invention was that of Father Verbiest, a missionary at Peking, China, who placed an æolipile with jets playing on a revolving winged wheel geared to the wheels of a car. James Watt, the famous Scottish inventor, patented in 1784 an invention for propelling vehicles by steam, but this was never brought to fruition. William Murdock, an apprentice of James Watt, made in the following year a miniature steam tricycle; in 1790 Nathaniel Rend, of Massachusetts, U.S.A., made a steam carriage with two cylinders, whose pistons were connected to racks which moved pinions on the driving axles, ratchets preventing motion except in one way. The second successful steam carriage was that made by Richard Trevithick and his friend Vivien about the year 1802. The crankshaft of the steam-engine was geared to the driving wheels, and a speed of 10 miles an hour was obtained, but after three years, during which time the inventors had spent all their money, the car was sold for driving a hoop-rolling mill—work which it performed satisfactorily for many years. Julius Griffiths built, in 1821, in the works of Joseph Bramah, the first steam carriage that had comfortable accommodation for passengers; its generator was the first example of the now widely used tubular boiler, its engine had two vertical cylinders, and there was a condenser which returned the recovered water to the boiler. More than one car in the early decades of the 19th century was fitted with a system of propulsion by mechanical legs and feet in rough imitation of animal motion; David Gordon's car is the best example of this. W. H. James's steam car, built in 1824, had two tubular boilers and a four-cylinder engine, and the pistons were coupled in pairs to a two-piece crankshaft, upon each part of which was keyed a rear road wheel; thus the driving wheels were independent of each other, and there was no need for the differential or balance gear, which is a complication of nearly all modern motor-cars. Sir Goldsworthy Gurney built, in 1828, some cars with which Sir Charles Dance established a regular service between Gloucester and Cheltenham, running four journeys daily, each journey occupying from 45 minutes to an hour. A great many other names, notably those of Walter Hancock and Dr. Church, figure in the early history of the steam car in Great Britain, but it is hardly worth while mentioning them, because the steam cars produced in the early days, before the opposition of the rail-

way companies ruined the growing industry, cannot be regarded seriously as prototypes of existing steam cars.

The really important part of the history of the early days of the automobile movement concerns petrol cars, and petrol cars alone. The story can be told quite briefly. The invention in Germany, in the year 1884, of the high-speed gas-engine by Gottlieb Daimler led to the foundation of the present enormous industry. The Daimler engine was adapted two years later for use on a bicycle, the necessary explosive mixture being supplied by causing air to pass through spirit of petroleum contained in a suitable vessel—a carburetter—ignition being obtained by the use of a tube kept hot by a small lamp flame. Almost contemporary with this was the invention of the Benz petrol motor and car. Gottlieb Daimler himself built an automobile *char-à-banc*, but perhaps the greatest progress in the practical application of the Daimler motor was that made in France by the firm of Panhard and Levassor and by the firm of Peugeot Frères. It has been well said that the modern petrol car is but an improvement on the original Panhard car.

Concerning electric cars there is little to say as regards either the past or present. The first electrically-propelled vehicle to run on common roads was Ruffard's tricycle, constructed in 1881, this having a tiny electric motor energised with current from twelve Faure small accumulator cells. Ruffard adapted a horse-drawn omnibus for electric propulsion. Pouchain, Bogard, Darracq, Jeantaud, Krieger, Jenatzy, Mildé and Patin, are European names connected with the development of the electric motor-car; in America Barrows, Morris and Salom, Sturgess, Hiker, Ellicson, Bersey, and Baker have all produced electric cars, one or two of which are still being made in a modified and improved form.

Of many agents available as the source of power in motor-cars, only one—petrol—has attained world-wide popularity. The reason is not far to seek. Steam involves the use of a boiler—by many persons regarded as a dangerous element in a car—and is not so economical in fuel as the petrol system, in addition to which the steam cars of American manufacture introduced about 1900 were so flimsily constructed and inadequately supplied with fittings that ought to have been regarded as essential, that the general public has been made shy, generally speaking, of the steam car; the electric car is ideal, except for the fact that storage batteries are very heavy, and facilities for recharging do not exist everywhere; the petrol-electric car has many of the advantages of the electric, together with the capability of undertaking long runs, but it is necessarily expensive and—to some minds—complicated. The petrol car is the most economical with regard to fuel; it can undertake very long journeys without fresh supplies, although this is not so necessary as it once was, as petrol is rapidly becoming a well-distributed commodity; its complication is real, but not unduly apparent, and although in truth it must be said that the modern petrol car is an inefficient piece of mechan-

ism, it is yet much more efficient than any other form of automobile.

The elements of the mechanism of the petrol car will here be briefly examined and described. The car has two distinct parts—body and “chassis.” The body is an example of the coachmaker's and trimmer's art, and in itself is not remarkable. The chassis comprises the whole of the mechanism of the car, though the original French word implied only the frame which supported and held together the various elements. Briefly stated, the following description will apply entirely to the chassis. It consists of a main frame suspended by springs over axles, to which generally are fitted pneumatic-tired wheels. In the majority of cases, there is an engine in front, and its motion is conveyed through shafts and wheels, perhaps through chains also, to the rear road wheels, which make the driving effort between the car and the road. The frame is a rectangular construction, preferably of pressed steel, but optionally constructed of wood armoured with steel plates, or of steel tubes filled with ash wood. The side suspension springs are a special design adapted from those in use on horse-drawn vehicles. The axles are of forged or tubular steel, and either themselves fixed—“dead”—with the road wheels running freely in bearings on their ends, or they themselves rotate in bearings—“live”—and have the road wheels keyed to, and forming one with them. The tyres—still the weakest element of the car—are made of india-rubber, with an inner tube to contain the compressed air, and a thick outer cover to give strength to the tyre and to help in protecting the inner tube from puncture.

Undoubtedly the chief interest of a petrol car lies in the motor or engine. This is of the internal combustion type; that is, the heat necessary for its operation is generated within the engine cylinder itself, instead of, as in the case of a steam engine, under a boiler quite apart from the engine. With one or two exceptions all modern petrol cars employ engines working on the Otto four-stroke cycle. The meaning of this is as follows: To complete the cycle of operations in the engine necessitates four strokes of the piston; on the first stroke (outwards) the charge of combustible or explosive gas is sucked into the engine cylinder; on the second stroke (return) this charge is compressed; on the third stroke (outwards) the charge is exploded and thus the piston is given a violent effort, which is transformed into useful work through the intermediary of connecting-rod, crankshaft, etc.; on the fourth stroke (inwards) the burnt gases—products of combustion—are expelled from the cylinder, leaving it empty and in the same condition as it was prior to the first stroke. The operation of a petrol engine will be understood from the following: Assume a steel cylinder with one end open and the other closed, and a plunger or piston similar in shape to that in a common syringe working to and fro in it. A connecting-rod is hinged to the piston and connected at its other end to a crankshaft, so that a to-and-fro movement of the piston is transformed into a rotary movement of the crankshaft.

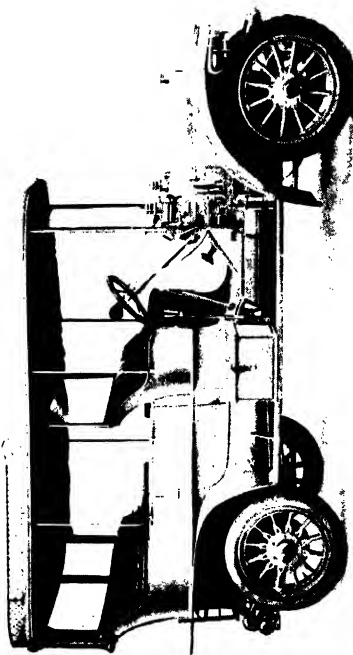
The crankshaft carries a flywheel which acts as a reservoir of energy and will continue to revolve by reason of its own mass and momentum even after all motive effort has ceased. The closed end of the cylinder is called the head. In this head is a hole communicating with a gas-maker—the "carburettor." The hole is closed by a valve—the "inlet valve"—which is arranged to open only at certain times. There is another hole in the head of the cylinder—also closed by a valve—and communicating directly with the outside atmosphere; this is the "exhaust valve" and it also opens just when required and at no other time. Assume that the piston is placed in the cylinder to within a short distance of the head and that the flywheel is now revolved by hand. The piston will travel from the closed end of the cylinder, and in so doing will cause a partial vacuum in the cylinder between itself and the cylinder head. Either as a result of this or by means of gearing suitably arranged, the inlet valve communicating with the gas-maker or carburettor will open and a charge of gas will flow very rapidly into the cylinder. The piston is now making its *inlet* stroke. The connecting-rod of the piston being connected to the crankshaft there will be a point in the movement or "travel" of the piston when the forward motion will stop and the piston will begin to go back. At this point the inlet valve closes, and as the piston continues to ascend the gas will be compressed until it occupies but a fraction of the space it did in its normal state. This is the *compression* stroke. The flywheel continues to revolve, and so when the piston is once more near the head of the motor it begins its second outward stroke, this being the third stroke of the cycle. At this moment the compressed charge of explosive gas is ignited by means of an electric spark, and the charge expanding with a very violent effort forces the piston to descend. This is the *working* stroke. Again the piston ascends, and whilst it does so, the exhaust valve previously mentioned opens, and the burnt gases and products of combustion pass into the atmosphere. This is the *exhaust* stroke. This cycle of operations takes time to explain, but actually is completed, in say, the 500th part of a minute, that is for every 1,000 revolutions of the flywheel there are 500 complete cycles of operations, and the flywheel receives 500 distinct efforts, its momentum keeping it in motion between the working strokes. The cylinder walls are liable to become extremely hot, and therefore, in the case of small engines, they are formed with radiating fins or flanges to conduct the heat into the quickly moving air, and in the case of larger engines the cylinder walls are formed double and the space is occupied by water which is constantly changed and cooled in the "radiator," a tubular construction placed right in front of the car.

The gas-maker or carburettor is an extremely simple device, by means of which a jet of pulverised petrol—which is a distillation of petroleum—is brought into contact with a stream of, generally, warm air. The feed of petrol to the jet where it is pulverised or sprayed, is regulated by a float contained in a separate chamber; this float rises on

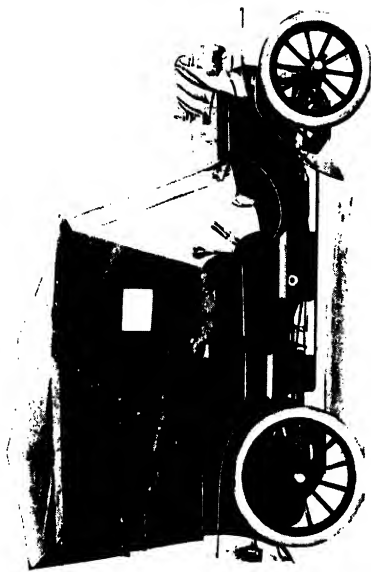
the incoming petrol, and when a certain limit is reached closes the admission valve. This form of apparatus is known as the float-feed spray carburettor. Early carburettors were of the "surface" type—that is, the air was carburetted merely by allowing it to bubble up through a vessel of petrol. The "automatic" or "compensated" carburettor has generally an auxiliary air inlet, so that when the engine speed increases and the explosive mixture supplied by the carburettor tends to become too rich owing to the greater suction of the engine, the auxiliary air valve will come into play and cause the mixture to be diluted.

The electric spark which serves to ignite the explosive mixture is formed by passing a current of high-tension electricity from one point to another within the cylinder, the current being obtained from dry batteries, more generally secondary batteries or accumulators, or, as the case with many modern cars, from magneto machines or dynamos directly driven by the engine. It is possible to use the low-tension current just as it is taken from battery or magneto to produce the spark within the cylinder, it being necessary for this purpose to use a special form of igniter, the tips of which (within the cylinder) are made to separate slightly at the moment when the spark is required. However, it is much more usual to intensify the current in a trembler coil and to employ a form of sparking plug in which there is no moving mechanism whatever, the spark passing from its point (within the cylinder) to the wall of the cylinder itself, which acts as the return path for the current. Of course the spark is not always passing within the cylinder, the contact being made at the right moment by means of a special device, so allowing the spark to occur just at the end of the compression stroke which forms the second stroke in the cycle.

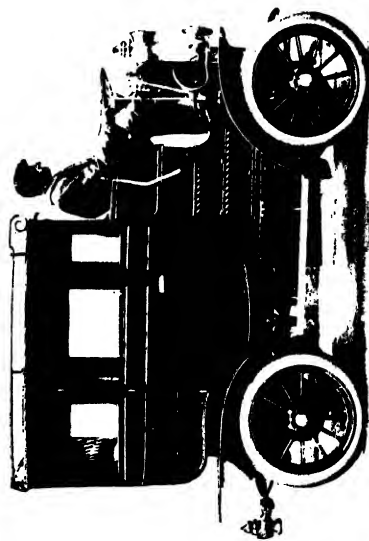
The engine flywheel has already been mentioned. This also, as a rule, forms part of the transmission gear by means of which the engine power is transmitted to the rear road wheels of the car. The flywheel contains a friction clutch, this being a simple device by means of which a disc attached to a shaft can be brought into frictional and driving contact with the surface of the flywheel. The shaft to which the disc member of the clutch is secured passes, in the ordinary form of petrol car, to what is known as the gear box, and a continuation of the shaft in the gear box carries toothed wheels of varying diameters which engage respectively, one at a time, with similar toothed wheels carried by a sliding sleeve on a second shaft. The second set of wheels can be slid longitudinally, but when rotated their shaft has to rotate with them. Changes of speed are obtained by causing various pairs of wheels—one wheel on one shaft and one on the other—to engage. To get the low speed a small wheel on the first shaft engages with a big wheel on the second, and *vice versa*. In most cars there is a device by means of which the highest speed of which the car is capable is obtained by a "direct through drive," for which no change-speed gear wheels are in mesh, the drive being direct through crankshaft, flywheel and driving shaft to the final transmission gear. The drive from the gear box is accomplished



ARIEL-SIMPLEX 28-38 H.-P. WITH CANOPY AND WIND SCREEN.
SIDE ENTRANCE.



DURYEA 15-18 H.-P. TONNEAU WITH HOOD AND
STORM CURTAINS. SIDE ENTRANCE.



ARGYLE 16-20 H.-P. 4-CYLINDER CAB.



BERLIET PHAETON 60 H.-P.

in one of three ways: (a) Through a countershaft with differential gear, sprockets and side chains to sprockets fixed on the rear road wheels, these wheels rotating freely in bearings supported by fixed "dead" axles. (b) A long shaft drives through bevel gearing the two halves of a "live" rear axle (contained within a tubular casing), on the ends of which road wheels are keyed. In this case the differential gear is carried by the axle itself. (c) The shafts in the gear box must in this arrangement be lying across the car, and the shaft from which the final drive is taken carries a sprocket from which passes a single chain to a sprocket surrounding the differential gear of the "live" rear axle, upon whose ends, as in the previous case, the road wheels are keyed. These brief statements tempt a fuller explanation, but the function of the differential gear must be described. It will be understood that when a vehicle turns a corner, the outer wheels revolve much more quickly than the inner ones. If both the rear wheels were connected rigidly to the same source of power there would be a great deal of dragging and slipping on the part of one or both wheels when the car was turning a corner or passing over an unequal road surface; and so means have to be provided whereby the speed of one wheel can be increased and that of the other lessened when required. The means provided is a differential or balance gear introduced between the two parts of the countershaft or "live" rear axle, as the case may be, which for this purpose cannot be made whole. The differential gear is invariably contained within a casting which is itself surrounded by a bevel toothed ring or sprocket ring which takes the drive from the change-speed gear.

Transmission by belts was common in petrol cars in the early days of the industry, but survived in only one or two cases after the year 1902. In this system it is necessary to have, for every different speed required, a large permanently fixed pulley on the main driving shaft. On a second motion shaft there are corresponding pulleys, one of which is loose upon its shaft. Whilst the belt runs over the loose pulley there is no transmission of power but by means of a fork; the belt can be displaced from the loose pulley to the fixed one, and then the power is transmitted. An early system was to have two cones with parallel axes so placed that the large base of one was opposite the apex of the other. This allowed of a progressive change of speed, and a belt stretcher was necessary to bring the gear into engagement.

Great attention has been paid to the brakes with which a motor-car is fitted. The general practice is to fit a brake on the chief driving shaft between the change speed-gear and the differential gear as well as a brake on each of the rear wheels. These latter brakes need to be very carefully compensated, for, should their action be unequal, the car is liable to make a very serious swerve when they are applied; this has many times been the cause of accidents.

Regarding the control of the petrol car, steering is accomplished by a hand wheel generally through a worm and sector gearing which operates a rod connected to the steering heads of the front wheels; the engine is started by a crank handle ordinarily

placed in front of the car; the amount of the explosive mixture passing to the engine is regulated by a small lever; the time at which ignition of the explosive mixture takes place—a factor largely determining the power of the engine—is controlled by another small lever; the connection between engine and gearing, that is the clutch, is under the immediate control of a pedal; the brake on the driving shafts is most often applied by a second pedal; the rear wheel brakes are applied by a side lever; and a second side lever operates the changes of speed. In addition, there may be a third pedal—a small one—which acts as an accelerator and cuts out the automatic governor with which most engines are provided and allows of a higher speed being obtained when desired.

Steam cars, as far as the arrangement of the chassis is concerned, have a general resemblance to the petrol cars described above; the modern tendency being to fit them with all the devices common in petrol car practice and so lose the natural advantage of simplicity which steam undoubtedly possesses. Main frame, springs, axles, and wheels may be as already described. The boiler for generating steam may be one of three or four types: (a) Water may be contained in a cylinder through which pass a great number of tubes open end to end, through which pass hot gases from the burner below. This is the fire tube boiler. (b) Water may circulate in tubes themselves contained in a cylinder through which pass the flames and hot gases, water being in the tubes and hot gases between the tubes. This is the water tube boiler. (c) The water is forced through very narrow tubes, the outsides of which are in direct contact with the hot gases from the burner; the tubes become so hot that as soon as the water is forced through them steam is formed. This is the flash boiler, a modification being known as the semi-flash. The steam is conducted to the engine, which may be modified from a design that has stood the test of everyday use for many decades. Simple expansion and compound engines are used, the latter having a special low-pressure cylinder in which the steam exhausted from the high-pressure cylinder is made to do further useful work. Finally the exhausted steam passes directly to the atmosphere, or, preferably, into a condenser where it condenses, so forming water which is returned to the feed-water tank. The transmission of a steam car may be simplicity itself and many vehicles have been constructed with but a simple chain from a sprocket on the crankshaft to a sprocket surrounding the differential gear of the live rear axle. Many others have had but a simple form of reducing gear. It will be understood that the steam engine is very much more flexible than the petrol engine—still more so was this the case until the year 1903 or 1904—and that whereas in the petrol car changes of speed must be obtained largely by employing a special mechanical device it is possible in a steam car to vary the speed merely by varying the amount of steam supplied to the engine. In connection with this variation some steam cars have had engine-driven pumps to vary the supply of fuel and water to the boiler in accordance with

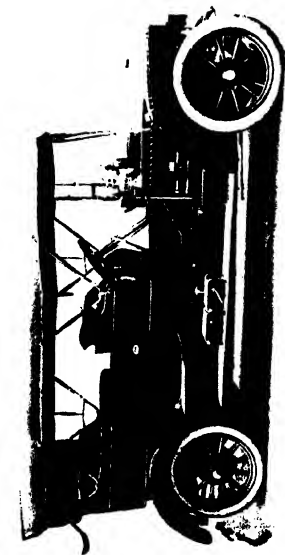
the varying amount of steam passing from the boiler to the engine. The final transmission in the modern steam car may be by means of a differential countershaft and side chains, longitudinal driving shaft and bevel gearing transmitting the power to a live rear axle, or by means of a single chain, passing from the driving sprocket to the driven sprocket on the live rear axle.

The electric car is the simplest of all forms of automobile. The main frame, springs, and wheels are much as in other cars. The source of power is a battery of accumulator cells which energise an electric motor, or possibly two electric motors, which may be geared directly to the rear wheel. By means of a controller various connections between the cells forming the battery and between the battery and the motor may be made, so altering the speed without any difficulty. It is this facility for changing speed, stopping and starting, and the sweetness of its motion that give the electric car so many advantages over petrol and steam cars. Its great disadvantages are the necessity of carrying a very heavy battery, and the difficulty of getting this re-charged. In consequence, electric cars are useful for town work only. Constant attempts are being made to produce a battery better suited to automobile use. The petrol-electric car resembles this car, but has in addition a petrol engine with its usual accessories, the engine driving the electric motor which now answers as dynamo, the current being conveyed to smaller motors which gear directly with the rear wheels. A small battery is generally carried for receiving the surplus current when the load on the engine is light, so forming a reserve of power for use in hilly districts or in the event of the petrol engine failing.

The legislation concerning the motor-car is recent history. The Locomotives on Highways Act, 1896, removed the restrictions with which motor-cars as "light locomotives" had previously been burdened; no longer was it necessary for three persons to be in charge of the car, with a fourth preceding it on foot and carrying a red flag, or for the speed to be restricted to four miles an hour on a highway and two miles an hour in a town or village. The speed limit was fixed at fourteen miles an hour, or any less speed prescribed by the Local Government Board, which body reduced the limit to twelve miles an hour. The Motor-car Act of 1903 supplements the Act of 1896, and repeals but one clause of it, namely, that relating to the speed limit, which was extended to twenty miles an hour, the Local Government Board having power, on the application of the local authority, to reduce the speed to ten miles an hour within certain limits and places. The Act of 1903, the Local Government Board's Motor-car (Registration and Licensing) Order, 1903, and the same body's Motor-cars (Use and Construction) Order of 1904 make a number of regulations regarding the registration of cars, the licensing of drivers, the use and construction of motor-cars and the conditions under which they may be used. The Act of 1903 was to continue in force for three years only, being of a provisional and experimental nature, but the period was extended in 1906.

Motteux, Peter Anthony, translator and dramatist, was born at Rouen, France, on February 18th, 1660, and came to England on the revocation of the Edict of Nantes in 1685. He settled in London, where he opened an East India warehouse in Leadenhall Street, and a few years later took up literary pursuits as a hobby. Along with Sir Thomas Urquhart and others he published a still-esteemed translation of Rabelais (1694), and afterwards wrote many plays, including a comedy, *Love's a Jest* (1696); a tragedy, *Beauty in Distress* (1698); and a masque, *Acis and Galatea* (1701). In 1711-12 he published a free translation of *Don Quixote* that has often been reprinted. He died in London on February 18th (his birthday), 1718.

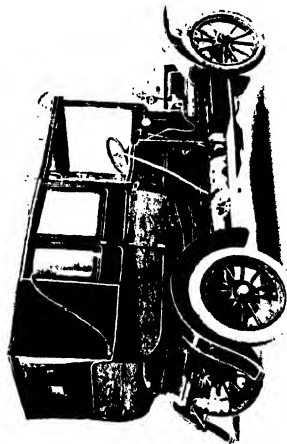
Motto (from an Italian word meaning "saying"; French, *mot*, "a word"), ordinarily understood, expresses in one or more words a maxim, principle, prayer, sentiment, invocation, or even an exclamation. This brief sentence is appended to a coat of arms, crest, or badge. Although the origin of the custom is obscure, both sacred and profane history establish the antiquity of the usage. Probably, in their crudest form, mottoes arose merely out of the shouts of combatants deriding or defying their adversaries, and, in the case of many of the Scottish Highland chieftains, it can hardly be doubted that they afterwards adopted as their own mottoes the slogans, or warcries, of their clans. The Duke of Leinster, a FitzGerald, illustrates this theory in his motto of *Crom a boo!* ("Crom [one of his castles] to victory"). After many maxims and sayings had become crystallised and appropriated, considerable ingenuity was displayed in the coining of new ones. Thus it was that the owners of them chose so often to express their feelings, ideas, or passions, and, as it were, to take the public into their confidence in matters of religion, love, or war. Adventures which had befallen them were sometimes commemorated, and such deeds of derring-do were naturally held in honour by their descendants, who continued to use the frank and pithy utterances without regard to the circumstance that they perhaps scarcely fitted them at all. On occasion a motto expressed, cynically or otherwise, the tenure on which lands were held, as in the "Free for a Blast" of the Clerks of Penicuik. Guillim, who wrote his *Display of Heraldry* in 1610—a work which is still a standard—maintained that a motto was an external ornament annexed to the coat of armour, being the succinctly expressed invention or conceit of the wearer, who displayed it in a scroll or compartment at the foot of the escutcheon. This was the English practice, but in Scotland and France it was usually placed above the crest. The heraldic motto is not necessarily hereditary, though its use is commonly retained by the successive bearers of the escutcheon to which it belongs. The motto of the royal house of Great Britain and Ireland, *Dieu et mon Droit* ("God and my right"), is supposed to have been a battle-cry of the time of Henry VI. The Prince of Wales's, *Ich Dien* ("I serve"), is believed to have been taken by the Black Prince from the blind King



DE DION-BOU-
TON TOURING CAR WITH
CAPE CART HOOD.



DE DIETRICH 12 H.-P. TOURING CAR.

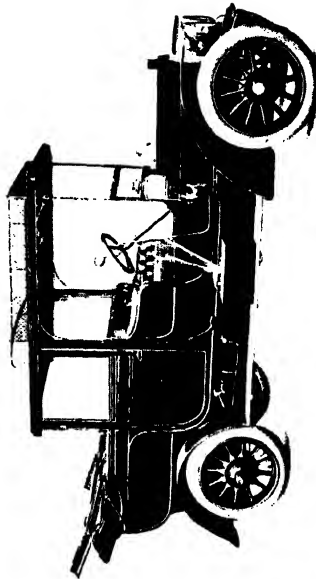


ARGYLE 16-20 H.-P.
5-SEATED LANDAU-
LETTE.

MERCÉDÈS 20-25 H.-P. SPECIAL
LANDAULETTE.



ARIEL-SIMPLEX 28-38 H.-P. LIMOUSINE
LANDAULETTE.



John of Bohemia, whose it was, whom he slew at Cressy (1346), in token that all men might know that he served under his father, Edward III. The motto of the Order of the Garter, *Honi soit qui Mal y Pense* ("Shame fall to him who evil thinks"), refers to the well-known incident of Edward III. and the Countess of Salisbury's garter. Among familiar examples of the employment of mottoes to declare religious sentiments, nothing could be more appropriate than the Duke of Roxburghe's, *Pro Christo et Patria* ("For Christ and Country"), or the Duke of Northumberland's *Espérance en Dieu* ("Hope in God"), or the Duke of Somerset's *Foy pour Devoir* ("Faith for Duty"). Several families have preferred mottoes that play upon their names, as the Cavendishes' *Cavendo Tutus* ("Safe by being Cautious"), the Vernons' *Ver non semper Viret* ("It is not always spring"), or the Onslows' *Festina Lente* ("Hasten slowly"). The origin of some mottoes—as, for instance, the Cornish "One and All"—cannot be certainly traced, and even some of modern date—like the British Volunteers' "Defence not Defiance"—have already become subjects of disputation. The playful use of mottoes in Christmas crackers is notorious, and it will be remembered that in "Ferdinand and Elvira," one of his *Bab Ballads*, W. S. Gilbert invents an amusing story to elucidate the mystery of their authorship. Junius's maxim, "Be Just and Fear Not," was a motto with a difference, as was also that selected by *Notes and Queries*, "When Found Make a Note of," the favourite catch-phrase of Captain Cuttle in Dickens's *Dombey and Son*. Dr. Johnson, as a lexicographer not averse from moralising, quotes L'Estrange's *Fables*, "It may be said to be the motto of Human Nature, rather to suffer than to die."

Moulton. [SHEEP.]

Mould, a general name for a variety of fungi belonging to several orders principally low in the series. They have mostly a filamentous or felt-like spawn or mycelium. Thus the name might be applied to the "white rust" of cruciferous plants (*Cystopus candidus*), the potato disease or the salmon disease (*Saprolegnia ferax*), among the Oomycetes; or to the mildew (*Puccinia graminis*) among the Ecididiomycetes. It is, however, more commonly applied to *Mucor* and its allies, among the Zygomycetes, and to *Eurotium*, *Tenella*, and allied forms, among the Ascomycetes. *Mucor mucedo* is the common white mould on fruit, jam, decaying mushrooms, horse-dung, etc.; *Eurotium herbariarum*, formerly known as *Aspergillus glaucus*, the green mould on bread; and *Penicillium glaucum*, the common blue mould. In saccharine liquids *Mucor* breaks up into detached round cells resembling yeast both in form and function. Moulds, while sending their ramifying mycelium through the substratum on which they feed, generally soon send upwards erect spore-bearing branches (*conidiophores*), the spores on which (*conidia*) become detached and rapidly spread the growth of the mould from new centres.

Moulding, a general name for the varieties of outline given by carving to the angles of certain parts of a building, such as cornice, capitals, base, etc. In classical architecture the mouldings are comparatively few, their form is always the same, and each has its fixed place in the order. Mediæval architecture forms a great contrast to Classical in this respect. The contour of Norman mouldings is simple, but the surface ornament gradually becomes rich and varied. Each of the Gothic styles has its characteristic mouldings, which are the best indications of the date of a building.

Moule, Henry, divine and inventor, was born at Melksham, Wiltshire, England, on January 27th, 1801, and was educated at Marlborough and St. John's College, Cambridge. In 1829 he became Vicar of Fordington, and for several years was chaplain to the military in Dorchester barracks. During the cholera epidemics of 1849 and 1854, his attention was drawn to the question of sanitation, and he invented the dry earth system for the removal of excreta. This plan has been adopted in country districts, encampments, some hospitals, and very widely in India. He also suggested (*The Times*, 1874, Feb. 24th and April 2nd) a method whereby gas might be extracted from Kimmeridge shale. He died at Fordington on February 3rd, 1880.

Moulins, capital of the department of Allier, France, on the right bank of the Allier, 124 miles N.W. of Lyons. The choir of the cathedral of Notre Dame dates from the 15th century, and the most conspicuous relic of the ancient castle of the Dukes of Bourbon is the large square tower built in the 14th century. Here Marshal Villars and the Duke of Berwick were born and Charendon wrote part of his *History of the Great Rebellion*. Pop. (1901), 19,810.

Moultrie, John, poet, was born in Lorien, England, on December 30th, 1799. His grandfather, John, as governor of East Florida, stood firm to Great Britain in the war of American Independence, while his grand-uncle, William, took the other side and successfully defended against the British Fleet under Sir Peter Parker, the fortress at the mouth of Charleston Harbor, the fortress being consequently named after him Fort Moultrie. John was educated at Eton and Trinity College, Cambridge, where he became intimate with Macaulay and his set. In 1820 he wrote poems on "My Brother's Grave" and "Godiva," which were regarded as of quite exceptional merit. Though he entered the Middle Temple, he gave up law and took holy orders, being presented to the rectory of Rugby in 1825. His appointment was almost concurrent with Dr. Arnold's headmastership of Rugby School. The two men became friends, and their joint influence counted for much for a long period. In 1843 Moultrie published *The Dream of Life*, in 1850 *The Black Fence*, and in 1854 *Altars, Hearths and Graves*. He also wrote several excellent hymns. On the whole, however, his early promise was not fulfilled. He died at Rugby on December 26th, 1874.

Mound Birds, a name given to the gallinaeous family Megapodidae, from the Oriental and Australian regions, owing to their habit of constructing large mounds of soil and leaves, in which the eggs are deposited and hatched by the heat of the decomposing vegetable matter. The birds of the type-genus *Megapodius*, about the size of small fowls, are, with one exception, of sombre



BRUSH-TURKEY.

plumage; the head is usually crested, the tail small, and the feet enormously developed. [BRUSH-TURKEY.]

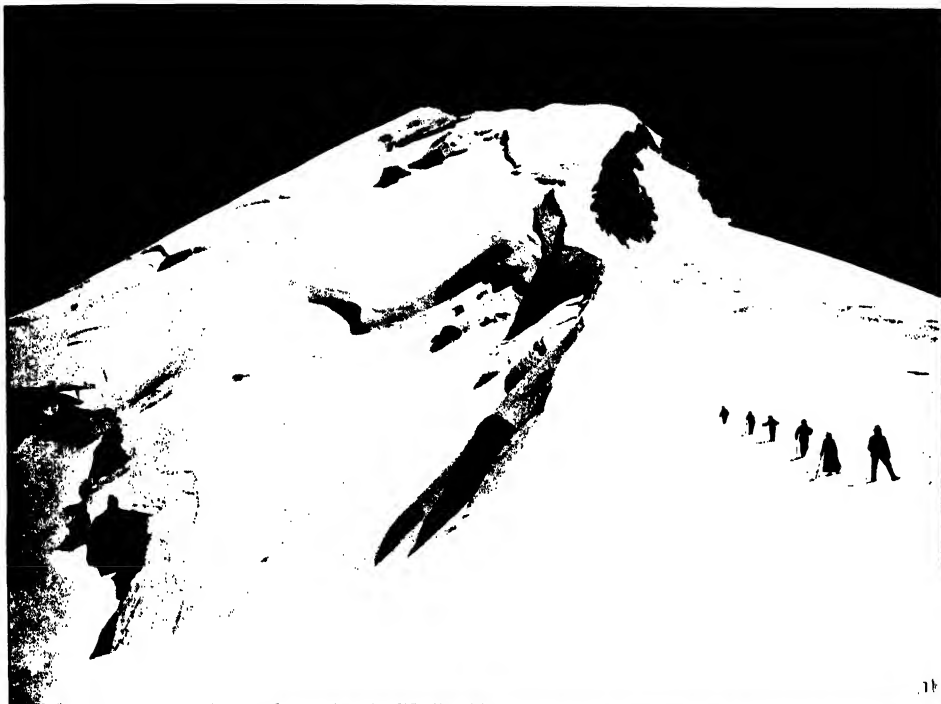
Mound Builders, a term applied to the unknown race or races who raised the numerous tumuli, forts, and other structures scattered over the Mississippi basin and other parts of the United States, but especially numerous in the Southern parts of Ohio. Here, W. K. Moorehead, in his *Primitive Man in Ohio*, recognises two distinct mound-building races, the old long-headed and the later intruding and conquering round-headed, besides traces of a still earlier palæolithic people near Cincinnati, possibly contemporaries of the mastodon, megatherium, mylodon, and huge extinct bears and jaguars. The chief seat of the long-heads was the Muskingum Valley from Marietta upwards to East Ohio, where the mounds, differing in type from those of the round-heads, have yielded pottery, articles of slate, hæmatite, copper bracelets, and other ornaments, some well made but generally inferior to those of the round-heads. This race had their chief centre in the Madisonville district at the head of the Ohio river, where have been found superior copper, horn, flint, stone, bone, and shell objects in great number. Some 24 miles to the north-east are the earthworks of Fort Ancient, the largest in Ohio, nearly a mile long and with over ten miles of artificial work. Chillicothe, on the Scioto river, is still the centre of the most interesting round-head remains, such as the Hopewell group, the Hopeton works, the Mound City, and other sites of pre-Shawnee

settlements, yielding potteries of artistic design and elaborate workmanship, finely chipped flints, copper objects, etc. Moorehead concludes that none of the mound-building races attained more than a high state of savagery, that they were skilled in several arts, but excelled in none, and that they were not even semi-civilised, much less possessors of the "lost civilisation" with which they have been credited. The best authorities, in fact, now regard them, not as a distinct race, but merely as the precursors or ancestors of the present aborigines.

Mounds, a general term, including barrows or burial-mounds, denoting the elevations raised in both pre-historic and very remote times, to commemorate some notable event, or the strange earthworks representing animal forms and probably connected with animal worship. [BARROW, MOUND BUILDERS.]

Mounet, Jean Sully, one of the greatest of modern French tragedians, was born at Bergerac, France, on February 28th, 1811. He originally studied for the Protestant ministry, but abandoned this project in favour of the stage, though his great ambition was to become a dramatic poet. He studied under Bressant at the Conservatoire. In 1872 he made his *début* at the Comédie-Française as Orestes in *Andromaque*. His chief appearances were in *Le Cid*, *Phèdre*, *Zaire*, *Horace*, *Polyeucte*, *Alhalie*, *La Fille de Roland*; in Victor Hugo's dramas *Hernani*, *Ruy Blas*, *Le Roi s'amuse*, *Marion Delorme*; in Alexandre Dumas's *Hamlet*, and in Paul Meurice and Vacquerie's *Antigone*. One of his finest performances was in the *Oedipe Roi*, by Jules Lacroix. In 1906 he produced *La Vieillesse de Don Juan*, which he wrote in collaboration with Pierre Carrier.

Mountain, a term somewhat loosely applied even by geologists, but perhaps capable of being restricted to two classes of elevated portions of the earth's surface, as opposed to hills, which form a third class. If hills be taken simply as elevations due to denudation—i.e. to the more extensive wearing away of the surrounding land—mountains may be either of accumulation or of elevation. Mountains of accumulation are simply those originally conical heaps of cinders bound together by penetrating dykes of lava which we know as volcanoes. Mountains of elevation generally occur in lines—often not continuous, but *en échelon* or overlapping—which are known as mountain-chains. These often coincide in direction with continental areas; but even in such cases as the Andes and the Himalaya the bulk of the chain may be of comparatively modern geological date. It is of the essence of a true mountain-chain that its rocks have undergone tilting, folding, or at least actual upheaval. The chain may be the result of one movement or of a series of movements in one age; but more often it is the result of a long succession of movements in various ages. Originating along a line of weakness in the cooling crust of the shrinking globe, it has again and again been crumpled upwards under the strain of compression. The crest of one fold has often been planed off by



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S. BHADUR.

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denudation and subjected to such a depression as to allow other rocks to be deposited across its denuded edges. [UNCONFORMABILITY.] These rocks may in their turn have been folded, planed and covered, and so on, at long intervals of geological time.

Mountaineering. The practice of ascending high mountains as a form of sport or recreation is of comparatively recent growth. Of course there have been mountaineers, if not quite as long as there have been mountains, at any rate as long as mankind has been organised into communities, and as each community has seen its way to improving its condition at the expense of its neighbours. We may imagine a tribe settled in some such fertile plain as is usually to be found at the foot of a great mountain group; a deep alluvial soil formed from the perpetual waste of the "eternal hills," and watered by the streams which the snows on their summits and the clouds that form on them perpetually feed. To them enters a fierce horde, possibly itself driven out in the struggle for subsistence by its own brethren, and saying to the comfortable plain-dwellers: "You shall starve ere I starve." Men in this frame of mind are not easily resisted. The men of the plains have to leave their cornfields, their olives and vines, and with such animals as they can save make their way into the mountain valleys, where at least a bite of grass may be had, and where in course of time they learn to plant such crops as the rougher climate will permit, and to eke out their resources, whether of food or clothing, by the capture of the wild animals that have sought the same refuge as themselves. It may be that in course of time, seasoned by a few generations of this hardy life, and with wits sharpened in the constant presence of emergency, they feel strong enough to turn the tables upon their original evictors, and again spread down to the regions where life can be won with less hardship. But the love of home is a strong influence among mankind, and with none is it so strong as among the dwellers in mountain lands. Individuals will go away to improve the family resources; it was the same spirit which led the Swiss of the 16th century to fight the battles of every potentate in Europe, and his descendant to start restaurants in every capital. But his heart is always in the mountains, and his aim is to return home and build himself a handsome house in his native village. Meanwhile his brother has been cutting timber in the forest, or tilling his patch of rye or potatoes, and at intervals pitting his own skill and endurance against those of wild beasts and birds where these still exist. In a word, he lives the life of a mountaineer. From this, however, to what we mean when we speak of "mountaineering" is a long way. A sentimental interest in the life of mountain-dwellers seems to have sprung up as part of the general interest in nature and the natural life of which Rousseau, about the middle of the 18th century, is credited with being the first great apostle. Before that time there had doubtless been mountain enthusiasts; but they were mostly scientific men, who, dwelling within easy reach of the mountains, resolved at first to

investigate them in the interests of the sciences they cultivated. That some of them were led to love mountain travel for its own sake, as an introduction to some of the grandest manifestations of natural forces, testifies to the existence of some fundamental sentiment in human nature by which men are attracted to these sublime solitudes. Most vigorous and healthy men feel at times an almost insurmountable craving for "out-of-doors"; and the mountain life is the "out-of-doors" life in its most highly developed form. It is a significant thing that nearly all amateur mountaineers, while fully acquiescing in the rule which says that mountain expeditions should never be undertaken by a solitary traveller, confess that the full joy of a mountain scramble is only attained on occasions when a chance circumstance, or it may be a deliberate choice of the more risky course, has led them to transgress it. Nor, after all, are the risks so very great, if the solitary rambler be of sufficient experience to know a really dangerous situation when he sees it and turn back in time. The chief danger of solitude as compared with company, is that many accidents which would be trifling with aid at hand may so hinder the traveller's progress as to prevent his reaching shelter before nightfall; and a night's exposure at high altitudes may have serious consequences. The pastime of mountaineering may be said to have come to birth in the 'forties of the 19th century. The famous ascent of Mont Blanc by Horace Benedict de Saussure, of Geneva, in 1787, drew attention to that particular peak, and ascents of it continued to be made with some regularity during the first half of the 19th century; but few if any of those who achieved this feat seem to have cared to carry their mountaineering any further. Most of them were persons of means and leisure, with perhaps sporting proclivities, who ascended Mont Blanc as they might have performed any other feat that chanced to be in fashion. If any epoch may be assigned for the rise of modern mountaineering, no better date can be fixed than the appearance in 1843 of Professor J. D. Forbes's *Travels in the Alps*. No doubt Forbes originally visited the Alps in the interests of science as a geologist and investigator of mountain phenomena. But the mountain passion took hold of him, and he wrote that and another book—*Norway and its Glaciers* (1853)—instinct with the mountain spirit, which no one can define and no one who has been stured by it can ever mistake. Then came Mr., afterwards Sir Alfred, Wills's *Wanderings in the High Alps* (1856), and the formation, a year or two later, of the Alpine Club, by which it may be said that mountaineering acquired a place among recognised sports. To the first pioneers the Alps offered an interest which now has to be sought in far remoter regions. Very few parts of the chain had been surveyed in any but the most superficial manner. The same peak would be known by half a dozen different names, according to the side from which it was viewed; nor could the traveller when crossing a pass feel any certainty as to the valley into which he was descending. Accommodation was limited if hospitality was plentiful. In remote villages the

parsonage still offers to the traveller his best hope of food and lodging. Now, however, things are altered. Every route has been traversed, every peak ascended, most by several different lines. The only problems that remain for the adventurous climber are those concerning the practicability of the few hitherto unattempted routes; and it need not be said that the reason why these have not been attempted is usually the manifest danger involved in trying them. To this may partly be attributed the greater frequency with which, after all allowances for exaggeration, accidents have occurred in recent years, as compared with the 'fifties and 'sixties. During the first twenty years of the Alpine Club's existence, not more than one or two of its members lost their lives through mountain accidents. The most serious dangers are those arising from bad weather. On some of the higher peaks, notably Mont Blanc, storms develop with great suddenness, and often continue for several days. Yet even of these the approach is usually indicated by signs apparent to the experienced native; and the prudent traveller will take the advice of such, perhaps, more confidently than that of his guide, naturally anxious for a job, and act upon it, leaning rather to the side of over-caution than of rashness. If the weather be good, a properly equipped party (which in all arduous expeditions should consist of not fewer than three persons) runs as little risk in a climbing excursion as in any recognised form of active exercise. Of course a climber should be sound in wind and limb, and careful to keep within the limits of his strength, remembering that a breakdown at a critical point may endanger the lives of the whole party. A novice particularly should test himself on some easier expeditions above the snowline before attacking any really difficult climb. A heart and other organs perfectly capable of even hard exertion at lower levels, may be over-ried by the conditions prevailing at loftier altitudes. The mysterious quality known as "nerve" is also very differently affected by different tests. Many a bold football-player or fearless rider to hounds may be rendered utterly helpless by the sensation of hanging on to a steep slope of snow or rock, and seeing the world between his knees.

The equipment of the climber is simple and inexpensive. His clothing should be entirely of wool; provided it be strong, the shabbier the better. His boots should be of the stoutest make, studded with strong square-headed nails, which are perhaps best put in by a local shoemaker. He carries a stout ash pole, from 4 ft. to 4 ft. 6 in. long, with a steel spike at the lower end, and at the head an axe or rather adze, continued backwards into a curved spike projecting somewhat farther, in the best models, behind the pole than the axe does in front. The natives of mountain countries also use irons with short spikes, attached to the boots by thongs. These have of late years come much into favour with English climbers; and they undoubtedly give great security of footing on ice, besides saving much of the labour of cutting steps. A rope of Manila hemp is indispensable on a glacier, and often a useful pre-

caution on rocks. For a party of three, 60 feet will be sufficient. It should be firmly secured round the body of every member of the party; in no case must it be held in the hand only. In awkward places it is prudent for one person only to move at a time; the rest remaining firmly anchored to bear the shock of a slip. The proper use of rope and axe practically obviates all legitimate risks.

Those who, for whatever cause, are unable or unwilling to go as far as the snowy ranges, will find country within the limits of Great Britain capable of affording the intimate access to Nature in her grandest aspect, coupled with a spice of adventure, in which the attraction of mountaineering chiefly resides. Scotland is, of course, pre-eminent in this respect; but owing to the fact that so much of that country has to serve as a field for the sport of wealthy persons, the approach to its natural beauties is said to be somewhat restricted. No such obstacle is placed in the way of the Rambler in Wales or in the mountain regions of Cumberland and Westmorland. Both these districts furnish plenty of opportunity, whether to the wanderer of losing his way or to the gymnast of breaking his limbs; or, it may be, of avoiding those disasters by the exercise of his own powers—mental and physical.

Mountjoy, CHARLES BLOUNT, Earl of Devonshire, and eighth Lord, was born in 1563. Arrived at Court as a young man, the favour which Elizabeth showed him piqued the Earl of Essex, who challenged him to a duel in which the former was wounded; but the men became friendly in later years. Blount was elected M.P. in 1584, took part, as a volunteer, against the Armada (1588), and, in 1594, was appointed governor of Portsmouth. In 1600, he was sent to Ireland as Lord Deputy in succession to Essex, and crushed O'Neill, the Earl of Tyrone, and laid the country waste. Blount returned to England in 1603, and in the following year was created Earl of Devonshire and Keeper of Portsmouth Castle. The Lady Rich scandal gave him, as well as William Laud, who had married the couple, great concern in his last years, and he died in London on April 3rd, 1606.

Mount Morgan, a town in the county of Raglan, Queensland, Australia, situated near the source of the Dee, 28 miles S.S.W. of Rockhampton, to which there is a railway. It lies at the foot of the hill the summit of which forms the richest gold-field in the State. Said to have been sold, as a site, to a syndicate including the Morgan brothers for £640, the value of the yearly output is now estimated at £800,000. The town became a municipality in 1890, and has a pop. of 9,600.

Mount Vernon, the residence of George Washington, situated in Fairfax County, Virginia, U.S.A., on the right bank of the Potomac, 15 miles below Washington. Here Washington retired after the War of Independence, and here he was buried. The house and estate were purchased for the nation in 1856, for £40,000, mainly through the instrumentality of the Ladies' Mount Vernon Association.

Mouse, the popular name of many of the smaller species of the sub-family Murinæ, of the family Muridæ, to which more than one third of the Rodents belong. The Common Mouse (*Mus Musculus*), originally Asiatic, has followed man in his wanderings all round the globe. Besides the Rat, two other species are British—the Harvest Mouse (*Mus minutus*), which brings forth and rears its young in a round nest of grass and reeds, and the Wood or Long-tailed Field Mouse (*Mus sylvaticus*). There are several other sub-families, of which one, the Voles (*Arvicolinæ*), has British representatives. [DEER-MOUSE, HYDROMYS, SHREW VOLE.]

Mousquetaires, soldiers who bore the musket, but particularly the two companies of cavalry that formed the King's bodyguard in France. The Grey Musketeers were enrolled (1622) by Louis XIII., the Black (1660) by Louis XIV. The companies were named from the colour of their horses, not from that of their uniform, which, on the contrary, was exceptionally brilliant. The King was captain, the lieutenants were always lieutenants-general, and only noblemen were admitted to the ranks. Suppressed in 1775, they reappeared from 1789 to 1791, and again in 1814, but were finally abolished in 1815. One of Alexandre Dumas' most popular romances, published in 1844, bore the title of *Les Trois Mousquetaires*.

Movable and Heritable. In Scots law all property is either movable or heritable. Movable property, on the death of the owner intestate, is divided amongst his next-of-kin. Heritable property goes to one person—the heir; or to more than one if the heirs are females in the same degree of relationship to the deceased. Heritable property comprises: (1) Land; (2) things annexed to the land—*e.g.*, houses; (3) things growing in the land, except those things sown and cultivated by the art of man—*e.g.*, corn, and grass sown by the tenant; (4) things destined to become part of the land—*e.g.*, where A had begun to build a house and had prepared material for it, and then died, it was held that the building materials were heritable by destination; (5) titles of honour and offices continuing after the holder's death; (6) leases of land; (7) money directed to be laid out in land by trustees; (8) property movable in itself (*e.g.*, furniture) which is disposed by will to go along with heritable property as part of the inheritance. All property other than the above is movable.

Mowbray, de, a Norman family who came over with the Conqueror. They became great nobles and played an important part in English history for upwards of three centuries. ROBERT, created Earl of Northumberland in 1081, came over with William I. His uncle, the celebrated Geoffrey, Bishop of Coutances, pushed the fortunes of his nephew, and on his death left Robert 280 manors. The earl built the New Castle upon Tyne, and the other strong fortress of Bamborough Castle, as well as Alnwick. He slew King Malcolm of Scotland on St. Brice's Day, 1091, in the course of the interminable Border warfare. In 1095 Robert re-

belled, was captured, and imprisoned for 30 years. Some of his honours and estates, but not including the Earldom, were bestowed on a kinsman, Nigel, who also took to wife Robert's wife. NIGEL had lands in Lincolnshire, Leicestershire (Melton Mowbray), and Yorkshire (Vale of Mowbray), besides smaller possessions elsewhere. His son ROGER (II.) was twice a Crusader, the first time with St. Louis and afterwards with Guy de Lusignan. On the second expedition he was captured by Saladin; and, though ransomed by the Order of the Temple, never lived to see England again. He died about 1189. The next noteworthy head of the house was WILLIAM de Mowbray, fourth Baron, who was one of the nobles chosen to be executors of Magna Charta. He died in 1222. His great-grandson, JOHN (I.) was of some importance under the second Edward. As a boy of 20, he accompanied Edward I. in that King's last Scottish invasion. Under Edward II. he led the life of a Border baron until he rebelled and suffered death in 1322. After the deposition of Edward II., JOHN (II.), the son of the last named John, was restored to the family honours and estates; and is reported by Froissart to have been at Nantes in 1348. He also fought at Neville's Cross. A son of this John, JOHN (III.), married a daughter of Margaret Plantagenet, through whom the Mowbrays became possessed, two generations later, of the office of Earl Marshal, and the great estates of the Bigods, formerly holders of that office. The first to hold this office was THOMAS (I.), who was also created Earl of Nottingham by Richard II. He it was who accused Bolingbroke, Earl of Hereford, of treason, and would have fought him in the lists had not King Richard stopped the duel and banished both the Earls (see Shakespeare's *Richard II.*). Thomas de Mowbray died in exile, at Venice, in 1399. His son THOMAS (II.) was never restored to his father's honours—an injustice which led him into rebellion against Henry IV. The rebellion was crushed and young Thomas executed at York in 1405. JOHN (V.), his brother, who succeeded him, is also immortalised in the pages of Shakespeare. He was a great warrior and statesman who, under Henry V. and during the regency, was one of the most powerful pillars of the State. In recognition of his services, Parliament resolved that he was rightfully Duke of Norfolk. On his death, his son JOHN (VI.) succeeded to the Dukedom. This John also made a considerable figure in the country; and, when the Wars of the Roses came, his weight and influence helped to turn the scale against Lancaster. To this cause he remained faithful until his death; and his son JOHN (VII.) was equally faithful, though he had not the ability of his father. John (VII.) died at an early age, leaving one child only, his daughter Anne, who was nominally married to Richard, Duke of York, one of the unfortunate princes smothered in the Tower. Duchess Anne left no issue; and the Mowbray title and honours became extinct, until some of them were revived by Richard III. in 1483, in favour of John Howard, a descendant, on the maternal side, of Thomas de Mowbray, first Duke of Norfolk. The Howards acquired both the Dukedom and the office of Earl Marshal, which they still hold.

Mowing-machine, or **LAWN-MOWER**, an implement for cutting grass. The revolving knives with which the machine is equipped are operated in such a way as to shear the grass like so many scissors. It is used for cricket pitches, bowling-greens, tennis courts, putting-greens, and lawns, and, though less effective as a shaver than the scythe, has practically replaced it, on account of its superior convenience and ease of working. It was introduced about the middle of the 19th century by the Ransomes, of Ipswich, Shanks, of Arbroath, and Green, of Leeds. American machines, owing to their lighter build and the consequent rapidity with which they can be handled, have obtained considerable vogue.

Moxa, a method of applying counter-irritation by burning some inflammable material upon the skin and soon producing a sore. This method of treatment is now rarely or never used. In China and Japan a soft substance is prepared from the young leaves of *Artemisia Moxa*, and used as a caustery, and hence the name of the process.

Mozambique, or **PORTUGUESE EAST AFRICA**, the name of a Portuguese province on the eastern coast of Africa, extending from Cape Delgado to Delagoa Bay. Its area is estimated at 300,000 square miles. Mashonaland and the Transvaal touch it on the west. The country is watered by the Rovuma, the lower waters of the Zambesi, the Sabia, and the Limpopo. The principal mountains are, north of the Zambesi, the Namuli (8,860 feet), and, to the south, Mount Doe (7,875), Mount Panga (7,610), and the Lebombo Hills (2,000). The soil is rich and maize, cotton, rice, sesame, and india-rubber are grown. The last named, with ivory, oil-seeds, and ground-nuts, is exported. Minerals of all kinds exist, but little is done to obtain them; nor are the pearls which abound on the coast much fished for. Customs duties are very heavy. In 1891 the colony was divided into the northern province of Mozambique, and the southern one of Lourenço Marques, each sub-divided into districts. The Governor-General resides at Lourenço Marques. The chief towns are Mozambique (pop. 8,000), the old capital, situated on a coral island, with a fort (built by Albuquerque), cathedral, and Government-house, and once a great centre of the slave trade; Quilimane (8,000); Beira (4,500), and Lourenço Marques, the capital (5,000), the terminus of the Delagoa Bay railway to the Transvaal. There is also a railway from Beira to Umtali on the Rhodesian border (about 200 miles). Population of Mozambique province, 3,000,000, nearly all natives (of the Bantu stock north of the Zambesi and of the Zulu tribe south).

Mozart, **WOLFGANG AMADEUS CHRYSOSTOM**, German composer, was born at Salzburg on January 27th, 1756. His first appearance in public was in a comedy of Eberlin's, performed in the hall of the university of Salzburg when he was only five years old. In the following year (1762) Mozart's father took him and his sister Maria on a musical tour. In February, 1765, two concerts were given in London in which all the overtures were of the boy's

composition. On his return, Mozart was put to study by his father, and at the end of 1768 he conducted some of his own sacred music before the emperor. A year later he left Salzburg for a tour in Italy. At Milan an opera of Mozart's was received with immense applause, and he was commissioned to write several others. In March, 1771, the Mozarts returned to Salzburg, where for the next few years Wolfgang was busy composing symphonies, concertos, masses, and serenatas, and in studying the works of other masters. In 1777, he set out with his mother for Paris. At Mannheim he fell in love with Aloysia Weber (afterwards, as Madame Lange, a great singer). His mother, to whom he was devoted, died in Paris (1778) and, in June, 1779, Wolfgang was again in Salzburg. In 1781 he was entrusted with the composition of a grand opera (*Idomeneo*) for the Munich carnival. Soon after this he finally threw up his position as concert-meister to the Archbishop of Salzburg. In 1782 his opera *Die Entführung aus dem Serail* was produced with great success at Vienna, and soon afterwards he married Constance Weber, Aloysia's sister. In 1786 he produced his *Nozze di Figaro*, which was a brilliant success, and, in 1788, *Don Giovanni*, his operatic masterpiece. The extraordinary popularity of *Don Giovanni* caused the Emperor Joseph to make him "Kammer-Musicus" at £80 a year. Though these operas had gained Mozart a great reputation, he was to the end in straitened circumstances. Nevertheless, when Frederick William II. of Prussia, after the composer's visit to Berlin in 1789, offered him the post of kapellmeister at a reasonable salary, he declined rather than abandon "his good emperor." The latter in return ordered Mozart to compose a new opera. This was *Così fan Tutti*. Under Leopold II. Mozart received the reversion of the kapellmeistership of the cathedral, but did not live to enjoy it. His last compositions were *Il Flauto Magico* (*Der Zauberflöte*), and a *Requiem*, the latter written for Count Walsegg, who produced it as his own! Mozart had now fallen into ill-health, and he died in Vienna on December 5th, 1791. To the lasting shame of the authorities and townsmen, he was buried like a pauper in a nameless grave. Mozart's best works besides his operas are some symphonies (the "Jupiter" one of the greatest) and masses. He was master of the organ, violin, and piano, his playing on all of them arousing extraordinary enthusiasms.

Mozley, **JAMES BOWLING**, theologian, was born at Gainsborough, Lincolnshire, on September 15th, 1813, and was educated at Grantham Grammar School and Oriel College, Oxford. He was elected a Fellow of Magdalen in 1840, and took an active part in the movement led by Pusey and Newman. In 1856 he became rector of Old Shoreham, Canon of Worcester in 1869, and two years later exchanged this preferment for the Regius Professorship of Divinity at Oxford. He died at Shoreham on January 4th, 1878. His chief works were the Bampton volume on *Miracles* (1865), the *Theory of Development* (1878), in answer to Newman, and *Essays, Historical and Theological* (1878). His

sister Anne (1809-1891), essayist and reviewer, edited his *Letters*, and his brother Thomas (1806-1893), was a Tractarian divine and a leader-writer on *The Times*.

Msket, or MZKET, a town of Russian Caucasus, Government of Tiflis, on the Kan, 10 miles N.N.W. of Tiflis. The ancient capital of Kartalia, it is the oldest city in the Caucasus, and, till the 15th century, was the residence of the Kings of Georgia. In its palmiest days it was 24 miles in circumference, and could place 80,000 fighting men in the field. Destroyed by Tamerlane about 1390, it was not rebuilt, although the cathedral erected by King Mirian in 328 was restored in 1865, and there is another church of the 4th century. During the construction of the railway from Tiflis to Poti, on the Black Sea, a vast necropolis was discovered, the remains in which seemed to prove that the Georgians were descended from the Iberians.

Mucilage, a term formerly confined to the vegetable gums obtained from plants by extraction with water, but now generally used for any viscid solution of gummy material.

Mucin, a proteid material, found in the mucous secretions of animals. It may be obtained, from such sources, as a white mass soluble in weak alkalis, but not in water.

Mucous Membrane. The mucous membranes form the internal lining of certain cavities in the body. The mucous membrane of the digestive tract extends from the mouth throughout the whole length of the alimentary canal, and is more particularly described under DIGESTION. The mucous membrane of the respiratory tract lines the larynx, trachea, and extends along the bronchi into the pulmonary cells. [LUNGS.] The genito-urinary tract is also lined throughout by mucous membrane.

Mud-Fishes, fresh-water fishes of the order Dipnoi, or Double-breathers, which have lungs as well as gills, the heart showing affinities with the amphibians, and the paired fins with a central axis.



CERATODUS.

There are two genera: *Ceratodus*, from Queensland, and *Protopterus*, from tropical Africa. Both are esteemed for the table. *C. forsteri*, which attains a length of about six feet, is a vegetable feeder. It is said to leave the water at night, but probably does not travel far, owing to the weakness of its limbs. The *Lepidosiren* of zoological gardens (*P. annectens*), which has external gills, lives on small fish, frogs, and insects. When the streams dry up these fish bury themselves in balls of mud,

and become torpid. These balls have been dug out, and sent to Europe and America, where the fish have revived after a short immersion in water. *Lepidosiren paradoxa*, described by Natterer, from the Amazons, is probably a species of *Protopterus*. The name Mud-fish is also given to some other fish that bury themselves in the mud, notably to the North American bow-fin (*Amia calva*), a ganoid in which the swim-bladder is cellular and performs to some extent the functions of a lung.

Mudie, CHARLES EDWARD, bookseller and founder of Mudie's Library, was born in Chelsea, London, on October 18th, 1818. After assisting his father, a dealer in second-hand books, he set up for himself (1840) as bookseller, stationer and publisher, in Southampton Row (then Upper King Street), Bloomsbury. Two years later he began to lend books, and by 1852 this business had attained to such dimensions that he moved to larger premises in New Oxford Street. He paid special attention to forthcoming books, for many of which he subscribed in great numbers. Branches were opened in due course in other parts of London, as well as in Manchester and Birmingham, and in 1864 the concern was converted into a limited company. Mudie became a member of the first London School Board (1870), and died at Hampstead on October 28th, 1890. In the selection of books he necessarily had to exercise a certain censorship, but it was held by many authors that he was disposed to carry this too far, and George Moore criticised his method in 1885 in his *Literature at Nurse, or Circulating Morals*.

Mud Volcanoes are generally small conical hills of mud with a crater at the top, giving off steam or other gases with the mud. In Sicily they are known as macalubas, and have been explained as due to the slow combustion of beds of sulphur. The gases emitted are carbon-dioxide (CO₂), carburetted hydrogen (CH₄ and C₂H₄), sulphuretted hydrogen (H₂S) and nitrogen, and the water often contains salt, whence such volcanoes are termed *salses*. They occur in Iceland and the Yellowstone Park, at Baku on the Caspian, and in the regions of the Lower Indus, where some of them reach 400 feet in height and have craters 90 feet across.

Muezzin, an Arab word, signifying a public crier who calls to prayer. In Mohammedan countries the faithful are summoned to prayer at regular hours (dawn, noon, four o'clock in the afternoon, sunset, nightfall). These proclamations are made from the balcony of the minaret (the belfry in Christian churches) of the mosque or, if the building have no tower, from the side of the mosque. The equivalent custom in Christian countries is the bell-ringing for stated services.

Mufti, a Mohammedan law officer whose duty it is to expound the law which the Kadi (judge or magistrate) has to execute. In the religious hierarchy of the Turkish empire, the Grand Mufti, or Sheik-ul-Islam, is the head of the Ulema, or assemblage of doctors of sacred law and divinity the interpreters of the Koran. His power and influence are scarcely inferior to those of the

Grand Vizier. In India, officers when off duty and wearing civilian dress were described as being "in mufti." The term is now commonly used, not only in the British army but of all officials, whether highly or lowly placed, who doff in private life the uniform which they are required to wear in pursuit of their occupation. Occasionally the phrase "Grand Mufti" is employed by way of more or less good-humoured contempt.

Muggleton, LODOWICKE, heretic, was born in London in 1609. He was a tailor by trade, whose religious opinions had been loosely agnostic until 1651, when he believed that he was the subject of an inward illumination by means of which the meaning of the Scriptures was opened to him. His enthusiasm infected his cousin, John Reeve (1608-1658), and the pair declared themselves the "two witnesses" of Revelation xi. 3, with powers of prophecy and the authority to pronounce damnation on individuals. They made a few converts, but were imprisoned for blasphemy in 1653. After Reeve's death Muggleton conducted the movement himself. His controversies were chiefly with Quakers. In 1677 he was again tried for blasphemy and sentenced to the pillory on three separate days, to a fine of £500, and to have his books burned before his face. He was imprisoned in Newgate in default of fine, but released six months afterwards on securities of good behaviour. He ceased to proselytise actively and died in London on March 14th, 1698. He was a pure-minded, clean-living man. The sect he founded became known as Muggletonians. They held there was no distinction between the persons of the Trinity, that God has a human body, and that Elijah represented Him in heaven when He came down to die on the cross. Muggleton also rejected prayer and taught that the devil is a human being. It is said that the last of the sect died in 1668, but this must be difficult of proof.

Mugwump, denoted originally an Indian chief, hence a person of importance. When John Eliot (1604-1690), the "Indian Apostle," translated the Bible into the Indian tongue he rendered "leader" and "duke" by the Algonquin word *mugwump*, meaning "a chief." The name was applied to the Republicans who, during the United States Presidential election in 1884, supported the Democratic candidate, Grover Cleveland, in preference to the nominee of their own party. Hence a person who kicks over the party traces, and is thus apt to be independent in his views, is often described as a Mugwump.

Muhlhausen, a town of Saxony, Prussia, on the Unstrut, 25 miles N.W. of Gotha. It became important in the 10th century, was the centre of Anabaptism after the Reformation, suffered much in the wars of the 18th century, and was ceded to Prussia in 1815. The weaving of cotton and woollen goods is the chief industry, but cigar-making, tanning, dyeing, and brewing also flourish. Prosperous and well-built suburbs have grown up round the old town, which contains, among many ancient structures, the churches of St. Mary and St. Blasius, and a fine town-hall. Pop. (1900), 33,428.

Muir, John, Sanskrit scholar, was born in Glasgow, Scotland, on February 5th, 1810, and was educated at Irvine Grammar School, Glasgow University, and Haileybury College. Having entered the Civil Service he held various posts in India until, in 1844, he was appointed first Principal of the newly-founded Victoria College, Benares, where he succeeded in introducing the plan of teaching Sanskrit and English concurrently. Next year he became Civil and Sessions Judge at Futehpur. He retired in 1853, and settled in Edinburgh, where he devoted himself to the furtherance of higher education. He established the chair of Sanskrit in the University and the Muir Lectureship in Comparative Religion. He died in Edinburgh on March 7th, 1882. From Oxford he received the degree of D.C.L. (1855), from Edinburgh that of LL.D. (1861), and, on the creation of the Order in 1878, the C.I.E. His great work was *Original Sanskrit Texts on the Origin and History of the People of India* (five vols., 1858-70).

Muir, Sir William, statesman and Orientalist, was born in Glasgow, Scotland, in 1819, and was educated at Kilmarnock Academy, the Universities of Glasgow and Edinburgh and Haileybury College. He entered the Bengal Civil Service in 1837 and filled, in rapid succession, several important posts. During the Mutiny he was in charge of the Intelligence Department at Agra. He became Lieutenant-Governor of the North-West Provinces in 1868, Financial Minister in 1874, and member of the Council of India in 1876. He was appointed Principal of Edinburgh University in 1885 and retired in 1902. He died in Edinburgh on July 11th, 1905. Muir was created K.C.S.I. in 1867. He was a profound Arabic scholar, his chief works being *The Life of Mahomet* (1858-61), *The Koran and the Testimony it bears to the Holy Scriptures* (1878), and *Annals of the Early Caliphate* (1883).

Muirkirk, a town of Ayrshire, Scotland, 26 miles E. by N. of Ayr. It lies at a height of 720 feet above the sea in a somewhat wild country. The iron-works, dating from 1787, form the chief industry, but there are also coal mines and limekilns. A Roman camp and so-called Druidical remains occur in the neighbourhood. John Lapraik (1727-1807), a minor poet, who lives perhaps more in Burns's praise than in his own verses, was born near Muirkirk and, on the ruin of his fortunes, opened a public-house in the town in 1796. Pop. (1900) 5,670.

Mukden, the capital of Manchuria, China, on a branch of the Liao, 110 miles N.E. of Newchwang, its port near the Gulf of Liao-tung. It is a walled town and contains a summer palace of the Emperor, and does a considerable trade in furs and agricultural produce. It contains the Imperial tombs of the reigning Manchu dynasty, since the period of the founder, who, in 1625, altered the name of the town from Shin-yang to Mukden. In 1904, during the Russo-Japanese War, it acquired great strategic importance. After his defeat at Liao-yang, General Kuropatkin retired upon Mukden, pursued by the Japanese. A battle on a colossal scale was

fought here in 1905, the Russians being heavily defeated, and forced to retire from Mukden towards Harbin. Pop. estimated at 250,000.

Mulatto, an Italian word, a diminutive of *Mulo*, a mule, and indicative of hybrid origin. The word is employed to describe the offspring of European and negro parents. The mulatto, though of yellow colour and with woolly or frizzled hair, resembles the white rather than the African.

Mulberry, a group of trees belonging to the genus *Morus* and the allied *Broussonetia* in the order Moraceæ, a group of the Incompletæ allied to the nettle, hemp, and elm families. *M. nigra*, the black mulberry, mainly cultivated for its fruit, is possibly a native of Armenia, but was early introduced into Greece, where its leaves are still used for feeding silkworms. It was probably introduced into England from Lombardy during the reign of Edward VI. The Asiatic species, *M. alba*, the white mulberry, of which there are numerous varieties, mostly with white fruit, is that mainly cultivated in Japan, China, India, and Italy, for the silkworm. The fibrous inner bark of *Broussonetia papyrifera*, the paper mulberry, is made into paper by the Chinese and Japanese, and into tapa cloth in the South Sea Islands. Mulberries are easily propagated even by large woody cuttings. The so-called fruit is formed from a whole cluster (raceme) of flowers, the perianth-leaves of each of which become fleshy, turn colour, and sweeten while they enlarge until they meet those of the other flowers, enclosing the true fruits, small dry capsules. [INFRAITESCENCE.]

Mulcaster, RICHARD, schoolmaster, came of a Border family and was born in 1530. He was educated at Eton, King's College, Cambridge (of which he was scholar), and Christ Church, Oxford, taking his M.A. degree in 1556. To his fine classical attainments he added a ripe knowledge of Hebrew and other Eastern tongues. He was appointed first head-master of Merchant Taylors' School, London, in 1561, and served till 1586. There is some reason to suppose that Edmund Spenser was among his earliest pupils. In spite of a hot temper, he was a great teacher. His farewell to the school, *Fidelis servus perpetuus asinus* ("The faithful servant is a perpetual ass"), possibly reveals something of the relations between him and the governors. From 1596 to 1608 he was high-master of St. Paul's School, London, and also rector of Stanford Rivers, in Essex, to which he was presented in 1598 by Queen Elizabeth, and where he died on April 15th, 1611. Mulcaster taught his boys music and singing, and they often took part in the Court Masques. He recognised, too, the advantages of physical training. His principal works were *Positions . . . Necessary for the Training up of Children* (1541), and the *Elementarie which entreateth chiefe of the right Writing of our English Tung* (1582).

Mulcer (MULCHER), a low-caste people of the Anamulay Hills, South India. They are almost black, with wavy curly hair and frizzly beard, resembling the Aeta (Negrito) aborigines of the Philippine Islands, and representing the primitive

black element in India. Their speech is a Malavalim (Dravidian) dialect.

Mule, a hybrid, of which the sire is an ass and the dam a mare. [HINNY.] Mules have been bred from an early period, and are highly valued in many parts of the world for draught and burden. In England they are chiefly used for draught; their powers of endurance make them valuable for many purposes, especially in war-time. They are largely bred in France, Spain, and Italy and in some of the states of the American Union, and in South America are replacing the llamas as beasts of burden, chiefly on account of their surefootedness. The fertility of mules is an unsettled question. Sir William Flower asserts that female mules are fertile with the males of either species; and Professor Wallace extends this to female hinnies, adding that the foal of the mule is seldom born alive.

Mulgrave Archipelago, a group of islands lying in the North Pacific Ocean, between 3° and 12° N. and 165° and 172° E. The chief are Radack, Ralick, Marshall, and Mulgrave islands. The Marshalls (pop. 16,000) and others having a total area of 158 square miles have belonged to Germany since 1885, Jaluit being the seat of government. Copra is the principal product. The Mulgraves were so named after their discoverer, Constantine John Phipps, second Baron Mulgrave (1744-1792).

Mülhausen (French, *Mulhouse*), a town of Alsace-Lorraine, Germany, between the Ill and the Rhine-Rhône Canal, 61 miles S.W. of Strasburg. Founded in the 7th century, it was for many centuries an independent free town, in league from 1446 with Switzerland. It became incorporated with France in 1798, but passed to Germany in 1871. It is a leading centre of the cotton industry, but silk, muslin, woollen and mixed fabrics, and chemicals are extensively manufactured, and there are also flourishing tanneries, dye-works, and factories for the construction of locomotives and other machinery. The old town-hall (1552) is almost the only relic of mediævalism. The industrial quarter, founded in 1853 by John Dollfus, is in many respects a model of organisation, and the *Société Industrielle* has done much to improve the condition of artisans. Pop. (1900), 89,118.

Mülheim, (1) a town of Rhenish Prussia, on the Rhine, nearly opposite to Cologne. The chief industries include manufactures of velvet, silk, machinery, and chemicals, besides brewing, tanning, and dyeing. Pop. (1900), 45,062. (2) A town of Rhenish Prussia, on the Ruhr, 16 miles N. of Düsseldorf. It has iron-works and coal mines and manufactures of leather, machinery, textiles, and glass. Pop. (1900), 38,292.

Mull, an island forming part of Argyllshire, Scotland, being the largest of the Inner Hebrides. It has an area of 235,000 acres, mostly rugged, mountainous, and barren, but affording pasture to sheep and black cattle. Ben More, in the centre, rises to 3,185 feet, and the coast on the Atlantic is

indented by Lochs Na-Keal and Scridain, and other bays. There are everywhere traces of volcanic action, the margin presenting terraces of basaltic rocks, whilst the internal valleys are filled up with lava and ashes of the Miocene period, but Old Red Sandstone is the principal formation. Tobermory (the "Well of Mary"), on the Sound of Mull, is the only town: it affords a safe harbour, and possesses a number of herring boats. Population (1901) 4,711.

Mullein, the English name of the genus *Verbascum*, herbaceous plants belonging to the order Scrophulariaceæ (said to be so called either because the plants were reputed remedies for scrofula, or because the knobs on their roots resembled scrofula). There are nearly 100 species, widely distributed throughout the temperate regions of the Old World; and six species, besides various hybrid forms, are indigenous in Britain. *V. Thapsus*, the Great Mullein, sometimes three or four feet high, is also known as Hag-taper, Adam's Flannel, or Bullock's Lungwort, from its growing in hedgerows (Anglo-Saxon, *haega*) and from its woolly leaves being used in rustic veterinary practice.

Müller, GEORGE, philanthropist, was born on September 27th, 1805, at Kroppenstadt, Prussia, and educated at Halberstadt, in preparation for the university, as his father wished him to become a clergyman. But in his *Narrative of the Lord's Dealings*, he accuses himself of a sinful youth, which brought him to actual want. Eventually he qualified as a preacher in the Lutheran Church. In 1826, during a long walking-tour in Switzerland, a great spiritual change was wrought in his character, and he was filled with a desire for missionary work. But his father opposed his wishes and withheld the support he had hitherto afforded him. Müller believed his wants were supplied by the special providence of God, a belief that had a still stronger effect upon his spiritual development. Through weak health he obtained exemption from military service. He came to England, and settled at Teignmouth as a minister, afterwards removing to Bristol. Consistently with his faith, he gave up pew rents and relied upon freewill offerings. In this spirit he started the philanthropic work with which his name is connected. In May, 1836, two houses were opened, and in the first year sixty-four orphaned and destitute children were received. He issued no appeal. Funds came in, he said, "as the result of prayer to God." For his various works to May 26th, 1895, £1,373,348 *cs.* 2½d. was received "by prayer and faith," and 120,763 persons were taught in his schools. The circulation of the Scriptures, and his extensive evangelistic tours were an important part of his labours. He died in his 93rd year, at Bristol, on March 10th, 1898.

Müller, JOHANN VON, historian, was born at Schaffhausen, Switzerland, on January 3rd, 1752, and educated at Göttingen University. He became Professor of Greek in his native town in 1772, but devoted his best energies to historical research. In 1772 he published his *Bellum Cimbricum*, followed by *Vierundzwanzig Bücher allgemeiner Geschichten*,

which he wrote at Geneva, where he lived from 1774 to 1780. It was not until 1780 that the first volume of his *History of the Swiss Confederation* made its appearance, and the fourth and concluding volume was delayed until just before his death. Soon afterwards he was appointed Professor of History and librarian at Cassel, but resigned both offices in 1783. Three years later the Elector of Mainz made him librarian and councillor of state. In 1792 he was established in Vienna, having work in the Imperial Library, but in 1804 he was called to Berlin as historiographer and councillor of war. Finally, in contradiction of all his previous opinions, he received from Napoleon in 1807 the post of Secretary of State in Westphalia, and died at Cassel on May 29th, 1809. Among his other works may be named *Reisen der Päpste*, *History of Frederick II.*, and an edition of Herder's writings.

Müller, JOHANNES, physiologist, was born at Coblenz, Germany, on July 14th, 1801. He received his education at Bonn University, where he became professor of physiology in 1830. Three years later he was promoted to a similar post in the university of Berlin, where he worked until his death on April 28th, 1858. His *Elements of Physiology*, completed in 1840, and translated into English by William Baly, marked a scientific epoch and has influenced all subsequent investigators.

Müller, JULIUS, theologian, was born at Brieg, Silesia, on April 10th, 1801. Studying law, from which he proceeded to the study of theology at Breslau and Göttingen, after grave spiritual conflict he became a formidable antagonist of the Rationalists. He was appointed pastor at Schönbrunn (1825), university preacher and professor of theology at Göttingen, professor in Marburg and in 1839 in Halle, where he died on September 27th, 1878. He established his reputation by his work on Sin, *Die Christliche Lehre von der Sünde*, which has been translated into English.

Müller, KARL OTERIEN, Greek scholar, was born at Brieg, in Silesia, on August 28th, 1797. He was educated at Breslau and Berlin under Boeckh, and showed a strong bent for Greek literature. He published in 1817 his first work, *Ægineticonum Liber*, which gained him an appointment at Breslau, whence he passed in 1819 to Göttingen as professor of archaeology. Müller's idea of reconstructing a mental picture of Greek civilisation was carried out in a very able series of books, of which his *Dorians*, *Orchomenos* and the *Minyans*, *Etruscans*, *Prolegomena to Scientific Mythology*, and *History of the Literature of Ancient Greece* are the most widely known. In 1839 he obtained leave to go on a tour in Greece, and, whilst excavating at Delphi, caught fever, of which he died at Athens on August 1st, 1840.

Müller, WILLIAM JOHN, landscape painter, was born at Bristol, on June 28th, 1812, and, after a good general education, was taught painting by J. B. Pyne. At first he occupied himself with Gloucestershire scenery, but the subject of his first Academy picture, in 1833, was *The Destruction*

of *Old London Bridge*. His work found appreciation at modest prices, *The Chess Players* bringing him but £25, though it has since been sold for £4,052. In 1841 appeared his able sketches *The Age of Francis I. of France*, and in 1843 he went into Lycia with the exploring commission. His health failed, and he returned home to die in Bristol on September 8th, 1845. Müller's landscapes rank amongst the highest. He was a fresh, free, dashing painter, excellent in colour, and admirable as a draughtsman, with a gift for selection that was quite unique.

Mullet, fishes of the type-genus *Mugil*, of the acanthopterygian family Mugilidae, in which the body is compressed and has no lateral line. There are about seventy species from the coasts of tropical and temperate seas, while many live in brackish water. They feed on organic matters in mud and sand, the top of the gullet being modified to form a kind of sieve. These fish, popularly known as grey mullets, from their coloration, are used for food, some of the estuarine species being esteemed. Günther suggests that it would be profitable to rear them in artificial backwaters for the market. *M. capito* is the common grey mullet, and other species occur on the British coasts. Red mullets belong to the genus *Mullus*, the type of a family allied to the Perches and having many species, mostly tropical. The European species (*M. barbatus*) is met with on the southern shores of England, and is highly valued as a delicacy. The male is smaller than the female, which was formerly described as a distinct species (*M. surmuletus*) and is popularly known as the surmullet.

Mullingar, chief town, co. Westmeath, Ireland, on the Brosna, 50 miles W.N.W. of Dublin. It is an important agricultural centre, large horse and cattle fairs being held periodically, and is also the resort of the anglers visiting Lough Ennel and others of the Westmeath lakes. Pop. (1901), 4,504.

Mullion, in Gothic architecture, a slender pier or vertical bar of stone separating the lights of windows, etc., different from the transom, which is horizontal. They arose in the Early English style; as the group of two or more windows placed close together was formed into a single window containing two or more lights, the separating pieces of wall became mullions.

Mulock, DINAH. [CRAIK.]

Mulready, WILLIAM, *genre* painter, was born at Ennis, co. Clare, Ireland, on April 1st, 1786. He came as a child to London with his father and, through Thomas Banks the sculptor, was admitted in 1800 to the Royal Academy schools, and in 1804 he became an exhibitor. His first works were landscapes, but in 1807, after a course of popular book-illustration, scene-painting, and so forth, he settled down as an interpreter of everyday English life. *Old Kaspar* (1807) was the first of a long series of works extending over half a century, and including *The Barber's Shop* (1811), *Idle Boys* (1815), *The Fight Interrupted* (1816), *Train up a Child*, *Choosing the Wedding Gown* (1846). He was elected A.R.A. in 1815 and R.A. in 1816. The

National Gallery has four of his works, and the Victoria and Albert Museum at South Kensington is particularly rich in examples. He worked in the Royal Academy Schools to within two days of his death, which took place in Bayswater on July 7th, 1863. The "Mulready" envelope, the first envelope devised for the penny post, was designed by him and introduced in 1840, but was soon discontinued.

Multan, or MOOLTAN, a district and its capital in the Punjab, British India. The district lies between the Sutlej and Chenab, with an area of 5,880 square miles and a population (1901) of 710,548. Along the river banks stretches a fertile strip which under careful irrigation yields heavy crops of sugar, indigo, cereals, and food-stuffs, but through the interior runs a high, barren ridge—the Bār—valueless except for pasturing here and there flocks of sheep. The climate is peculiarly hot and dusty, and the rainfall slight. Mohammedans form the majority of the population, the Jāt tribes of the rural districts being very uncivilised. The British conquered the country in 1849 from Mulraj, a nominal vassal of Ranjit Singh. MULTAN, the capital and the only important city, stands four miles from the left bank of the Chenab, and was formerly traversed by the Ravi, which has now altered its course. It consists of one large bazaar and a mass of dirty, tortuous streets, partially enclosed within three walls, but large suburbs have sprung up since 1860. The trade of the place is considerable, silks, cottons, and carpets being manufactured, whilst the pottery ware and enamel are highly esteemed. As the headquarters of the district, it possesses political importance. Beyond two Mohammedan shrines and a ruined Hindu temple, there are no monuments of interest. It is connected by the Sind, Punjab and Delhi railway with the East Indian trunk line at Delhi and with the northern districts of the Punjab. Pop. (1901), 87,394.

Multiple-pounding, a process in Scots law to determine which of two or more rival parties is entitled to a particular fund. Another use of the process is to determine in what proportions a fund is to be divided amongst claimants, who agree that all are entitled to some of it, but cannot agree how much each is entitled to. It is similar to the English legal process known as Interpleader. For example, where A B owes £1,000 to X Y, and three of X Y's creditors, C D, E F, and G H, have "arrested" the fund in A B's hands, A B may relieve himself of the responsibility of deciding whether he shall pay it all to C D, or E F, or G H, or shall divide it amongst them; and in what proportions he shall divide it, by issuing process of multiple-pounding. If A B fails to do so, any of the three creditors may raise the action in A B's name.

Multiple Proportions, LAW OF. [ATOMIC THEORY.]

Mum, a strong ale in favour in the 17th century, and even later. It is supposed to have been made from wheat-meal, flavoured with herbs and occasionally with the addition of oat-and-bean meal and eggs. Sir Walter Scott, in *The Antiquary*,

describes it as "a species of fat ale, brewed from wheat and bitter herbs, of which the present generation only know the name by its occurrence in revenue Acts of Parliament, coupled with cider, perry, and other exciseable commodities." The name is conjectured to have been derived from that of Christian Mumme, a German brewer, who first brewed it in 1492. A beer called mum also appears to have been brewed in Brunswick.

Mummy, a corpse embalmed and dried after the Egyptian mode for burial. A very early date, possibly 3,800 or 4,000 B.C., is ascribed to the beginnings of the art of mummification. The most ancient mummified remains known to science are the fragments of the body of King Menkara (Dynasty IV.), builder of the smallest of the three great pyramids of Gizeh. The mummy of King Merenra (now in Bulak Museum), and part of that of his father, King Pepi, both belonging to the Sixth Dynasty (about 3,000 B.C.), were discovered among the ruined pyramids of Sakkarah. The reason for mummification was probably a religious one. The Egyptians considered the inviolate preservation of the body essential to the corporal resurrection of the dead. They believed that the soul which was dissociated from the body by death would re-unite with it after its wanderings through the world, which might be from 3,000 to 10,000 years. The embalming of a man of wealth, done in the costliest manner, consisted of the evisceration and cleansing of the body, which occupied 15 to 16 days; the salting and bituminizing, 19 to 20 days; and the spicing and bandaging, 34 to 35 days. The abdomen was cleaned with palm-wine and filled with myrrh, cassia, and other materials. The bandages were made of linen, and varied in texture with the rank of the mummy; the quantity used was enormous. Each limb, finger, and toe was first swathed separately, and finally the whole body, the contours of the shrunken form being restored by padding. The process varied in different places and at different periods. Thus the mummies made at Memphis were black and brittle, while those of the best Theban epoch were yellowish, soft, and flexible. This softness and elasticity were attributed to the injection of costly chemical liquids into the veins. In Memphis mummies the chest cavity was often filled with scarabæ and amulets; and Theban mummies were ornamented with rings, collars, and bracelets. Mummification declined under the Greeks and Romans, and practically ceased about A.D. 700. The styles of mummy cases varied considerably, some being carved out of solid tree-trunks, and ornamented with inscriptions and paintings of Isis, Nephtys, vultures, &c. Some were ornamented with gold and brilliant colours, and carved in relief, whilst others were plain unpainted wooden coffins. The Guanches, aborigines of the Canaries, practised mummification in the Egyptian manner, and the Ethiopians adopted a similar method, whilst the Peruvians preserved their corpses dried in the sun. The Egyptians also embalmed sacred animals.

Mumps (*Parotitis*), a contagious febrile malady, associated with inflammation affecting the

salivary glands. Mumps is highly infectious and remarkable for the length of its period of incubation, which is rarely less than a fortnight and may extend to three weeks. The onset of the disease is attended with headache and fever, accompanied by tenderness behind the angle of the lower jaw, in which situation swelling subsequently appears, caused by inflammation of the parotid gland. The parotids of both sides are usually involved; the submaxillary glands are generally also implicated. The swelling seldom lasts for more than a week, and the disease almost always terminates in recovery. In rare instances, after an attack of mumps, inflammation affecting the testicle in the male and the breast in the female has supervened as a complication. Treatment as far as the patient is concerned consists mainly in confinement to bed, or at all events to one room, with maintenance of rest and quiet. The infectious nature of the malady demands that every precaution shall be taken to prevent the communication of the disease to others. In particular the patient must not resume relations with the outside world until at least three weeks after recovery.

Münchhausen, BARON, the hero of the renowned adventures that have made his name a byword for mendacity. He is believed to have really existed in the person of Karl Friedrich Hieronymus von Münchhausen, who was born at Bodenwerder in Hanover on May 11th, 1720, and died there on February 22nd, 1797. He was in the Russian army, and saw service against the Turks. He appears to have told his marvellous history to Raspe Rudolf, who did not scruple to add many more marvels borrowed from earlier impostors, and in 1785 published anonymously a small volume in London as the result of his labours and invention. Several enlarged editions speedily followed, but their authorship remains unknown. In 1786 Bürger translated the book into German, and was for years regarded as the original writer, but in 1824 his publisher revealed the truth.

Münden, a town of Hanover, Prussia, at the confluence of the Fulda and Werra, here forming the Weser, 15 miles W.S.W. of Göttingen. Its chief manufactures are sugar, glass, chemicals, india-rubber, and cigars, and coal-mining and millstone-quarrying are carried on in the vicinity. The old castle and St. Blasius' Church are buildings of some interest. Pop. (1900), 10,546.

Munden, SIR JOHN, rear-admiral, was born about 1655, and made a captain in 1688. He took part in the battle of La Hogue in 1692, and in 1701 was promoted to be rear-admiral and, upon conveying the king to Holland, was knighted. In the following year he was sent to intercept a French flotilla, but was, from no fault of his own, unsuccessful and a court-martial fully acquitted him of blame. Yet popular ignorance and prejudice demanded a sacrifice and Sir John was dismissed the service. He died at Chelsea on March 13th, 1719.

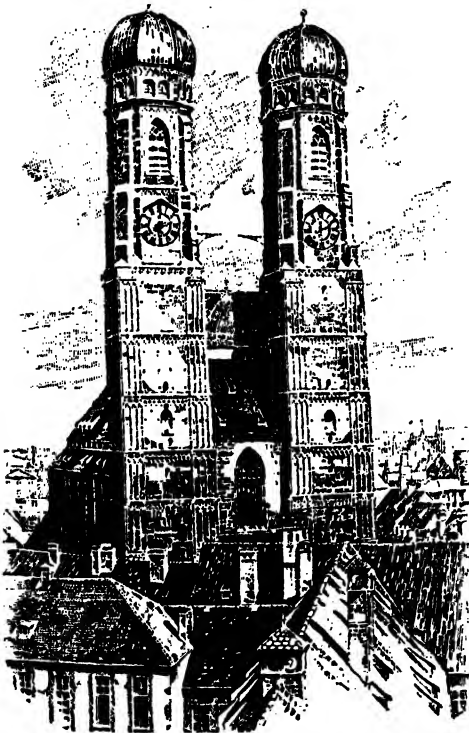
Munden, JOSEPH SHEPHERD, actor, was born in 1758. He began life at the age of twelve in an apothecary's shop, from which he frequently ran

away to join strolling companies. On 20th October, 1789, he married Frances Butler, an actress, at Chester. He first made his mark as "Faddle" in Mrs. Burgess's comedy, *The Oaks, or the Beauties of Canterbury*. After a short career in the provinces he returned to London in 1790, and played many parts at Covent Garden until 1811, which included "Don Lewis" in *Love Makes a Man*; "Darby" in *The Poor Soldier*; "Sir Samuel Sheepy" in Holcroft's *School for Arrogance*. Among his best impersonations were those of "Dozey," an old sailor in Dibdin's *Past Ten o'Clock and a Rainy Night*; the "Second Witch" in *Macbeth*, and "Dogberry" in *Much Ado about Nothing*. He also played in *King Lear*, *The Tempest*, *Twelfth Night*, etc. He retired from the stage through illness (1824), and died in London on February 6th, 1832. His acting was greatly admired by Charles Lamb, Hazlitt, Leigh Hunt and Talfourd.

Mungo, St. [KENTIGERN.]

Mungoose. [ICHNEUMON.]

Munich (Germ. *München*), the capital of Bavaria. It stands on a bare, lofty plateau, 1,700 feet



MUNICH CATHEDRAL.

above the sea, just north of the Bavarian Alps, the Isar skirting the eastern suburbs. The climate, therefore, is cold and unhealthy, but the central

situation facilitates railway communication with all parts of the Continent. The old town, dating from the 12th century, has lost its walls and moat, but its gates and quaint old streets remain. The new quarters, originating chiefly with the impulse given by Ludwig I. (1825-48), present features of great beauty and interest. The Ludwigstrasse, in the Renaissance style, is one of the finest streets in the world, and other thoroughfares are of nearly equal beauty, such as the Max-Joseph-Platz—with the royal palace and the national theatre—and the Maximilianstrasse containing the museum and most of the Government buildings. The many squares and open spaces are adorned with good specimens of statuary. The finest of the city gates are the Siegesthor, or Gate of Victory, designed after the arch of Constantine in Rome and dedicated to the Bavarian army, and the Propylæa (completed in 1862), commemorating the Greek war of Independence. In the ancient part of the town are several interesting churches, e.g. St. Peter's, the Frauenkirche (the cathedral), St. Michael's, and the Theatinerkirche, where are the tombs of the royal family. Parks and public gardens add to the attractions of the city, and the suburbs contain many handsome private dwellings. Munich is one of the greatest art centres. In the Glyptothek (1816-30) are lodged ancient and modern sculptures, including the famous *Aginetan* marbles; the Old Pinakothek (1826-36) contains examples of the Old Masters, and the New Pinakothek (1846-53) works by modern painters. Among the industries the first place is occupied by brewing, which is pursued on a colossal scale, but leather, machinery, paper, furniture, rubber goods, gloves, artificial flowers and carriages are largely manufactured. The city enjoys high repute for its optical, mathematical, and musical instruments, its printing, and its stained glass. Pop. (1900), 499,959.

Municipality, a town which enjoys certain rights of self-government, or the body in which these rights are vested. The Roman *municipia* were under the government of two magistrates called *duumviri*, who corresponded to the consuls at Rome and were elected by the *curia* or *decuriones*, a body comprising a limited number of the inhabitants. Amidst the dissolution of the Roman Empire, the *municipia* often succeeded in maintaining their privileges, and became models for the free cities of the Middle Ages. In countries, where few or no traces of Roman civilisation remained and institutions were derived mainly from Teutonic sources, the chartered town was simply a large village (*town*) to which had been transferred the right of taxation, jurisdiction, and so forth, that had previously belonged to the lord of the manor or (on royal demesnes) to the officers of the king. These duties involved an organised corporation, which was provided for in the charter. As life became more complex, the scope of the functions exercised by the corporation or its officers was gradually enlarged. In England a self-governing town of this time was called a "borough," a term which has been somewhat vaguely used; it was long held to imply parliamentary representation, but after the

Municipal Corporations Act (1835) a distinction was made between "parliamentary boroughs" and "municipal boroughs," the latter including all municipalities with a reformed corporation, or a corporation modelled on the lines of the Act. After the passing of this Act, it was amended from time to time until, in 1882, an Act was passed repealing and consolidating all the earlier Acts, and boroughs are now subject to the Act of 1882. The corporation of a borough consists of a mayor (provost in Scotland), aldermen (Scottish bailies), and councillors.

Munkács, a town in the county of Bereg, Hungary, on the Latorceza, near the foot of the Carpathians, 80 miles N.E. of Debreczin. In the neighbourhood iron, alum, and the crystals called "Hungarian diamonds" are mined. Near the town, on an isolated hill, 580 feet high, stands the fortress which defied the Austrian arms from 1685 to 1688. It was captured by the Hungarians in 1848, but fell into the hands of the Russians in the following year, and is now used as a prison. Pop. (1901), 14,410.

Munkacsy, MICHAEL, painter (whose real name was LIEB), was born of poor parents at Munkács, in Hungary, on October 10th, 1846. Apprenticed as a joiner, his innate love of art led him to study, as his humble resources allowed, at Pest, Vienna, Munich and Düsseldorf. In 1870, he exhibited *The Last Day of a Condemned Prisoner* in the Paris Salon, and his merits received immediate recognition. Among his best-known works are *Milton dictating "Paradise Lost" to his Daughters* (1878), *Christ before Pilate* (1881), *Calvary* (1884), *The Last Moments of Mozart* (1886). He died on May 1st, 1900.

Munro, HUGH ANDREW JOHNSTONE, classical scholar and critic, son of H. A. J. Munro of Novar, was born at Elgin, Scotland, on October 19th, 1819. He was educated at Shrewsbury School and Trinity College, Cambridge, of which he was elected a fellow in 1843. After pursuing his studies in Paris, Florence, and Berlin, he returned to Cambridge, took holy orders and lectured on Aristotle and other classical subjects at Trinity. In 1869 he was elected to fill the professorship of Latin, founded in honour of Dr. Kennedy, but his unattractive manner failed to attract audiences, and he resigned the chair three years later. His texts of Lucretius and Horace, his Greek and Latin verse and his papers all evidenced the soundness of his judgment and the extent of his learning. Munro, who was an accomplished linguist, had a wide knowledge of literature. He considered Dante the greatest poet of any age, and this notwithstanding his familiarity with the works of Homer, Shakespeare and Goethe. He died in Rome on March 30th, 1885.

Munro, SIR THOMAS, major-general, was born in Glasgow, Scotland, on May 27th, 1761. Starting life in a merchant's office, he was appointed a cadet of infantry, and arrived in Madras in January, 1780. His regiment formed part of the force sent against Hyder Ali, and he attracted the attention of Sir Eyre Coote. Serving under Lord Cornwallis, he

was present at the capture of Bangalore. Peace being made with Tippon in 1792, Munro served under Captain Read in Baramahal, where he gained experience in civil administration. Here he formed the opinions on land tenure which are identified with his name as the *ryotwar* system, whereby peasant proprietors pay a land-tax directly to the State. When war was renewed with Tippon he rejoined the army, and was afterwards employed as one of the secretaries of the commission which arranged for the administration of Mysore. This brought him into contact with the future Duke of Wellington, with whom he formed a firm friendship. Appointed to the administrative charge of Canara, disorder was soon suppressed by his wise rule. More important duties were assigned to him, and the natives soon realised his justice and patience with all classes. Returning home in 1807, he remained in England for six years, the authorities repeatedly consulting him on questions affecting India. In 1814 he went to Madras in a civil capacity, but when the second Mahratta war broke out he was made brigadier-general. His success elicited a high eulogium from Canning, who declared that "Europe had never produced a more accomplished statesman nor India, so fertile in heroes, a more skilful soldier." He returned home, but only for a short time, for he was appointed Governor of Madras in 1819, a post which he filled with conspicuous success. In the course of a farewell tour, he was seized with cholera, and died on July 6th, 1827, mourned by all classes, and venerated by the natives as the defender of their rights.

Münster, the capital of Westphalia, North Germany, situated on the banks of the Aa half-way between Bremen and Cologne. It grew up around the *monasterium* (hence its name) established by Charlemagne as the centre of the Saxon bishopric, and five hundred years later became a prominent member of the Hanseatic League. It was here that the Anabaptist, John of Leyden, set up the Kingdom of Zion in 1534, which was dissipated in a year. Tendencies to Protestantism were sternly repressed by the bishops, who reached the height of their power in the 17th century, when Bishop Galen maintained an army of 20,000 men. The town suffered in the Thirty Years' War, which ended in the Peace of Westphalia, which was signed in the town-hall of Münster (1648). The town was occupied by both parties in the Seven Years' War. The bishopric was annexed to Prussia in 1803. The town-hall dates from the 14th century, the cathedral from the 13th, and the churches of St. Ludgerus and St. Maurice were founded in the 12th and 11th centuries respectively. The university was constituted in 1902 by the addition of faculties of law and politics to those of philosophy and theology in the old Academy. Münster is a military and judicial centre for the whole of Westphalia. There are manufactures of linen, cotton, paper, and leather, besides brewing and distilling. Pop. (1901), 63,776.

Münster, the largest of the four provinces of Ireland. It embraces the S.W. portion of the



island, and contains the counties of Clare, Kerry, Limerick, Cork, Tipperary, and Waterford, and has an area of 6,067,840 acres. It includes Macgillcuddy Reeks, the Galty Mountains, and other heights; the principal rivers are the Shannon, Suir, and Blackwater; and amongst the loughs are the far-famed Lakes of Killarney. The leading towns within its borders are Cork, Limerick, and Waterford. Before Henry II.'s conquest there existed the kingdom of North Munster and that of South Munster, but these were subsequently merged into one province, and much of the best land, having been forfeited in Elizabeth's reign, was granted to English colonists who settled there. Pop. (1901), 1,075,075.

Muntjac, a small deer of the species of *Cervulus*, a genus of southern and eastern Asia, Java, and adjacent islands. The males alone bear antlers, and their upper canines are tusk-like and curve downwards. From their alarm cry, muntjacs are called by sportsmen "barking-deer."

Muntz Metal, an alloy of copper and zinc, containing more zinc than the ordinary variety of brass. It is also known as Yellow Metal, and is very largely employed for the sheathing of ships. It is usually prepared by melting the copper in a furnace and running it out into the molten zinc, the proportions being about three of copper to a little over two of zinc. A part of the zinc is, however, always lost by volatilisation.

Münzer, THOMAS, was born in 1490 at Stolberg, Saxony, of poor parents. Educated at Halle and Leipzig in 1520, he was appointed parish pastor at Zwickau. By his eloquence he had a great influence on the weavers of the town, many of whom thought themselves the subjects of immediate inspiration. Among their leaders was Nicolas Storch. The Bible was rejected and human learning regarded as a hindrance to religion. In anticipation of the millennial reign of the saints, that is of themselves, Münzer formed a society governed by twelve apostles and seventy evangelists. But difficulties arose and sedition caused the magistrates to expel them from Zwickau. Being deposed, Münzer and his disciples made preaching tours. The fanaticism of his followers grew extreme. One of them defended himself for cutting off his brother's head on the plea that he was inspired to do so on the outbreak of the Peasants' War, provoked by a tyrannical nobility. The misguided people appealed to Luther, who refused to aid them, as he did not approve of the communism in which they sought relief from their hardships. Münzer became their leader, and returning to Mühlhausen headed a fierce rebellion as "Münzer with the Sword of Gideon." The insurrection was crushed on May 15th, 1525, and Münzer was executed on the 30th of the same month.

Muong (MU'ONG LA), a large semi-independent nation of thirteen tribes occupying the neutral zone between Yunnan and Annam from the Mekhong to the Hong-Kiang ("Red River"). Each tribe is under a separate chief, but all recognise a paramount lord, who resides at Shien-tien, and claims

sovereignty over all the aborigines of Yunnan, Kwei-Chen, and Kwang-si. They are a tall, strong, well-made race of a bronze colour, possessing a considerable degree of culture, with some knowledge of letters and a peculiar syllabic alphabet of thirty-six characters. They are good weavers and dyers. In 1886 they became French subjects.

Murena, a large genus of brilliantly-coloured marine eels, the type of a family from tropical and sub-tropical seas. [EEL.]

Mural Circle, a large metallic circle having a conical axis supported by a stone pier so that the circle is parallel to the face of the pier which is very nearly in the meridian. The instrument is adjusted so that the axis is accurately horizontal and the circle exactly in the plane of the meridian. The use of the instrument is to find the zenith distance of any star as it comes in the meridian. A telescope is firmly attached to the rim of the circle, its optical axis being parallel to the plane of the circle. The rim of the circle is accurately graduated from 0° to 360°, and six microscopes attached to the stone pier are directed straight on to the divisions. The use of six microscopes instead of one is to avoid error. A preliminary experiment determines the reading for the zenith, the circle is then turned so that the star, as it crosses the meridian, is bisected by the horizontal wire of the telescope. The reading for this is got from the microscopes, and the difference between this and that of the zenith gives the zenith distance of the star.

Mural Decoration, the ornamentation of walls by means of painting, mosaic, and other methods. This practice dates back to very ancient times. Thus we find Etruscan and Egyptian monuments embellished with reliefs and incised work, while the Greeks tinted their temples and touched with colour sculptured friezes and pediments. Coloured bricks were used by the Assyrians and wall-tiles formed a basis for the decoration of Moslem architecture. The Italians frequently used terra-cotta, coloured bricks, and arrangements of variously-coloured marble. Mural decorations executed in fresco have been unearthed among the ruins of Pompeii. In England many Tudor houses were built of parti-coloured brick. The principal methods of mural decoration are:—

(a). *Mosaic-work* (q.v.) in which a design is represented by a number of pieces of coloured marble, glass, or stone, placed in juxtaposition and united by cement. This method is very durable, and consequently frequently used for external decoration.

(b). *Encaustic Painting* was chiefly the Grecian method, though paintings on mummy-masks show that the Egyptians also used it. The medium was Punic wax. Some notes of this method by Pliny and others prove that it was a species of painting in which the colours were united and fixed by wax dissolved by heat. Several attempts have been made in modern times to revive it, though without conspicuous success. The most notable were those of Count Caylus and Mr. Bachelor in the middle of the 18th century, and of Mrs. Hooker of

Rottingdean in 1792. Encaustic Painting was also taken up in Germany, when Julius Schnoor was commissioned by Louis I. of Bavaria to execute a series of frescoes in this method in the Royal Palace at Munich. Mrs. Hooker's method is of interest. She dissolved gum arabic in water, then added gum mastic; when the mixture was thoroughly dissolved and had reached boiling-point, she added the wax. A thin coating of melted wax was laid over the finished painting by means of a hard brush, and then an ordinary flat iron, slightly heated, was passed over the surface. When cool the picture was rubbed with a fine linen cloth. In the German method, which is very similar, potash is mixed with the wax and, instead of an iron being passed over the surface, a vessel containing fire is held at a little distance from the picture. Results have also been obtained by the employment of a medium composed of turpentine and beeswax mixed to an oily consistency. Mr. Gambier-Parry somewhat modified this system. In his method, known as Spirit Fresco, the walls are covered with a compound of wax gum with spirit of lavender, the colours being ground with this medium.

(c). *Tempera* or *distemper* is a method of painting with opaque colours mixed with water and some glutinous substance such as size, white of egg, etc., applied to a ground of dry plaster or gesso.

(d). *Fresco* (q.v.), is a method of painting upon a ground of wet fresh plaster with raw pigments mixed with hydrate of lime, the essential principle being that in drying the colours should incorporate with the plaster. The painting can only be done while the plaster is wet. *Fresco*, though practised by the moderns is, *par excellence*, the medium of Italian Renaissance decoration. Traces of ancient fresco paintings are to be found in Egypt, and many examples of this work at its best are to be seen in the principal towns of Italy. *Fresco secco* differs from fresco in that it is executed on dry plaster which is moistened with lime-water before the application of the colours. This method is commonly used in Italy at the present day. The colours employed in fresco are somewhat limited, as only those are available which resist the action of the lime. These consist mostly of natural earths.

(e). *Water-glass*, as its name implies, is liquid glass. It is a modern German method considerably used by von Kaulbach. Water glass is not mixed with the pigments, but sprayed on to the finished painting which has been executed with colours dissolved in pure water. These, in themselves, when dry, would have but small consistence, and would speedily disappear but for the fact that they are firmly bound together by the hard, transparent, insoluble water-glass. Water-glass is of two kinds:—Potash water-glass and soda water-glass.

(f). *Oil Painting* cannot be used on fresh plaster, and even though the plaster be thoroughly dry, it should be protected by a covering of several coats of oil paint. A canvas ground fastened to the wall by a white-lead process is a still more

satisfactory expedient. Leonardo da Vinci's celebrated "Last Supper," was executed in oil-paint. He worked on a ground of plaster impregnated with mastic or pitch and covered with white lead. The vehicle he employed apparently had no union with the ground, and so the surface cracked in all directions.

The most famous examples of mural decoration are to be found in Italy. The fresco paintings by Pietro d'Orvieto in the Campo Santo, at Pisa, are among the earliest extant. Other grand examples are: "The Resurrection," in fresco, by Giotto, in the Arena Chapel, Padua; the "Last Supper," in oil painting, by Leonardo da Vinci, in Milan; the frescoes by Michael Angelo in the Sistine Chapel, Rome; the frescoes by Raphael in the Vatican; "Mansuetudo," in oil painting, by F. Penni and Giulio Romano, in the Vatican; "Jupiter and Juno," in fresco, by Caracci, in the Farnese Palace, Rome; "Recompense," a ceiling in oil painting, by Paolo Veronese, in the Ducal Palace, Venice; and many frescoes by Tintoretto, Veronese, Lippi, Tiepolo, and other masters in the palaces and churches of Venice and other towns in Italy. In Germany are the frescoes by Julius Schnoor, already referred to; also exterior frescoes at the New Pinakothek, Munich, and others by von Kaulbach. France is rich in modern mural decoration, the paintings of Puvis de Chavannes in the Pantheon and in the Sorbonne being among the most important, whilst many churches in the city contain examples of the work of Flandrin, Delaroche, Delacroix, Lesueur, and others. In London there are mural paintings by Lord Leighton and other modern artists in the Royal Exchange, the Victoria and Albert Museum, and in the Houses of Parliament, while examples of mosaic work may be seen in the Portraits of great painters in the Victoria and Albert Museum and in St. Paul's Cathedral.

Murano, a town of Italy, on an island 1 mile N. of Venice. It is the seat of the manufacture of the famous Venetian glass, an industry dating from the 12th century. The art declined in the 18th century, but was revived in 1860 by Antonio Salviati (1816-1900), the celebrated mosaicist. The chief churches in Murano are San Donato, a basilica of the 12th century, and San Pietro. Pop. (1901), 5150.

Murat, JOACHIM, General, was born at Bastide-Fortunière, dep. of Lot, France, on March 25th, 1767, and educated for the priesthood. He abandoned that career at the first chance and enlisted in the cavalry. Elected member of the Garde Constitutionnelle imposed on the king in 1791, he speedily rose to the rank of major; but his advanced views led to his being recalled from active service, and in 1795 he made the acquaintance of Bonaparte, whom he assisted in supporting the Convention on the 4th of October. He went with him to Italy and Egypt, where he won great distinction. On February 19th, 1799, being then a general of division, he carried out the famous *coup d'état*, and Bonaparte gave him the hand of his sister Caroline. At Marengo (1800) he contributed to the victory

and became a marshal of France, with the title of prince. More glory and further distinction were earned on the fields of Austerlitz (1805), Jena (1806), Eylau (1807), and Friedland (1807), until in 1808 he was entrusted with the conduct of affairs in Spain, and as a return for his services received the crown of Naples. He quarrelled with Bonaparte during the retreat from Moscow, and endeavored to attach himself to Austria. Talleyrand met this design and Murat then proclaimed his intention of liberating Italy and was expelled from his dominions. After the overthrow of Bonaparte, who refused to accept his aid at Waterloo, Murat attempted a descent on Calabria, was captured, tried by court-martial and shot at Pizzo, in Italy, on October 13th, 1815. His widow (b. at Ajaccio, 1782; d. at Florence, 1839) assumed the title of Countess of Lipona (an anagram of Napoli [Naples]). His elder son, Napoleon Achille, migrated to the United States, where he married a niece of George Washington.

Muratori, LUDOVICO ANTONIO, antiquary, was born at Vignola, Italy, on October 21st, 1672. He was trained in archaeology by Bucchini, the Duke of Modena's librarian. Entering the priesthood, he obtained employment in the Ambrosian Library at Milan, where he published his *Anecdota* or extracts from historical manuscripts. In 1700 he succeeded his patron at Modena. His enemies accused him of heresy, but Pope Benedict XIV. extended to him his protection, and he retained his position, dying at Modena on January 23rd, 1750. Among his numerous works may be mentioned *Iterum Italicarum Scriptores, A.D. 500-1500*, *Notus Thesaurus Veterum Inscriptionum*, *Antiquitates Italie Medii Aevi*, and *Annali d'Italia*.

Marchison, SIR RODERICK IMPEY, geologist, was born at Tarradale, Ross-shire, Scotland, on February 19th, 1792. Entering the army at the age of fifteen, he fought under Wellesley and Moore, taking part in the battle of Corunna. He left the service early. An accidental meeting with Sir Humphry Davy attracted his mind towards science, especially geology. In a few years he had explored large tracts of England and Scotland, and been elected joint-secretary of the Geological Society (1826). In 1831, when he became President of the Society, he began the investigations which led to the establishment of the Silurian system, the name given to his volume published in 1839. This was followed much later (1854) by a more comprehensive treatise, entitled *Siluria*. About 1840 he resolved to explore the rocks of Russia, and in 1845 published the results in his great work on *The Geology of Russia and the Ural Mountains*. In 1843 he was elected President of the Royal Geographical Society, in 1846 was knighted, and in 1855 was appointed Director-General of the Ordnance Survey. In 1866 he received a baronetcy and subsequently founded the chair of geology at Edinburgh. He died in London on October 22nd, 1871.

Murcia, a province of Spain, with its capital of the same name. The province has a coast-line of 75 miles upon the Mediterranean, lying between

Alicante on the E. and Almeria on the W., having an area of 4,478 square miles, and in 1900, a population of 578,000. With the exception of the plain of Cartagena and the sandy strip enclosing the Mar Menor lagoon, the surface is broken by spurs of the Sierra Nevada, reaching in places an elevation of 5,000 feet. These mountains are rich in lead, zinc, iron, copper, and sulphur, which are exported largely from Cartagena, the chief port. The valleys, especially along the course of the Segura and its tributaries, yield, under irrigation, good crops of oranges, olives, rough wine, and cereals, whilst the mulberry is extensively grown for silkworms, and the esparto grass on the marshy levels forms a valuable product. Besides the capital and Cartagena, Lorca is the only town of importance, but Aguilas and Mazarron have harbours and some trade. The city of MURCIA stands on both sides of Segura in the midst of a very fertile valley, and is a handsome, well-built town, with fine squares and gardens. The cathedral (1358) is in the late Gothic style with classical additions, and near it are the Bishop of Cartagena's palace and the colleges of San Fulgencio and San Isidoro. The manufactures include silks and other textiles, hats, gloves, soaps, and musical instruments, and there is a brisk trade in agricultural produce. Pop. (1900), 111,700.

Murder. By the law of England, murder is the destruction of human life, accompanied with malice expressed or implied—i.e. an intention to kill or do great bodily harm or wilfully to place human life in peril; or killing resulting from an attempt to commit some other felony, or occurring in the course of resistance offered to Ministers or officers of justice or others rightfully engaged in carrying the law into execution. [For cases of culpable homicide not amounting to murder see MAN-SLAUGHTER.] Expressed malice is signified by one person killing another with a deliberate mind and formed design, which formed design is evidenced by external circumstances (discovering such inward intention; as by lying in wait, antecedent menaces, former grudges, and concerted schemes to do the victim some bodily harm. Implied malice is signified by one person's voluntarily killing another without any provocation; for when such deliberate acts are committed the law implies or presumes malice to have urged the doer to the commission of them, although no particular enmity can be proved; for instance, if anyone trespassing in pursuit of game, fires at a bird and, without any intention at all of doing so, hits and kills a man, that is murder, inasmuch as the act of poaching is felonious and the felony therein couples itself to the death, and supplies the intention which was lacking. The punishment of murder by English law is death.

Murdock, WILLIAM, inventor of gas-lighting (whose name was, rightly, MURDOCH), was born near Old Cumnock, Ayrshire, Scotland, on August 21st, 1754. He followed his father's trade as a millwright until 1777, when he entered the factory of Boulton and Watt, at Soho, Birmingham, and was employed in fitting steam-engines at Redruth, Cornwall. Here, in 1792, he discovered the value of coal-gas as an illuminant, and on his return to Birmingham as a

partner, continued his experiments until, in 1802, the works at Soho were lighted by gas. Murdock invented many useful modifications of the steam-engine and constructed a locomotive in 1784. He also directed his attention to the mechanical value of compressed air and made a steam-gun. Retiring from business in 1830, he died in Birmingham on November 15th, 1839.

Mure, Sir William, poet, was born at Rowallan, Ayrshire, Scotland, in 1594. His father he described as "ane strong man of bodie, and deltyed much in hounting and walking." His mother was sister of Alexander Montgomerie, author of the "Cherrie and the Slae." He was liberally educated, and "deltyed much in building and planting." Before his father died, in 1639, he gave much of his leisure to literature, but afterwards engaged in the stirring events of his time. In 1643 he was a member of the Scots Parliament at Edinburgh. He was wounded at Marston Moor (1644), and commanded his regiment at Newcastle. He "lived Religiouslie and died Christianlie," in 1657. Mure, who translated Latin verse, left numerous poems, his most ambitious work being the *True Crucifix for True Catholikes* (1629), an interesting but heavy poem. He paraphrased the Psalms, which the General Assembly of the Church of Scotland commended, and, in his later days, wrote his quaint *Historie and Descent of the House of Rowallane*.

Mure, William, classical scholar, was born at Caldwell, Ayrshire, Scotland, on July 9th, 1799, and educated at Westminster School and the University of Edinburgh. He spent several years at the University of Bonn, where he gained the extensive classical learning which qualified him to become the historian of Greek literature. He was M.P. for Renfrewshire from 1846 to 1855, and was elected Lord Rector of Glasgow University in 1847. He devoted his leisure to Greek studies. His chief work is the *Critical Account of the Language and Literature of Ancient Greece*, of which he published five volumes (1850-57), but did not live to complete. Mure strongly defends the unity of the authorship of the *Iliad* and *Odyssey*, attributing both to Homer. He died in London on April 1st, 1860.

Murfreesboro, capital of Rutherford county, Tennessee, United States, 30 miles S.E. of Nashville. From 1819 to 1826 it was the capital of the state. The chief industries are flour-milling, tanning, canning, and cotton-gin works. Close by was fought the battle of Stone River (Dec. 31st, 1862 to Jan. 2nd, 1863), between the Federals under Rosecrans and the Confederates under Bragg. The losses were equally heavy on both sides (over 9,000 each), but the Southerners were forced to retreat. Pop. (1900), 4,000.

Murger, Henri, French novelist and poet, son of a German *concierge*, was born in Paris on March 24, 1822. He was put as a boy into a lawyer's office, but soon wearied of the business. Count Tolstoy employed him for a time as secretary, but for ten years he seems to have led an obscure life of drudgery and dissipation. In 1848 he recorded

his experiences in the *Vie de Bohème*, and the book by its candour and vigour at once became popular. *Claude et Mirianne*, *Le Dernier Rendezvous*, *Le Pays Latin*, *Adeline Priotat*, *Les Buteurs d'Eau*, and *Le Sabot Rouge*, with a volume of verse, *Les Nuits d'Hiver*, came from his pen before 1859, when his health broke down and he died in a private hospital in Paris on January 28th, 1861. Since the *Vie de Bohème* was first dramatised in 1849, and played at the Variétés, when Mlle. Thuillier created the part of Mimi, it has become a stock piece. Puccini also set the subject to music and produced it at the Opéra Comique in 1898.

Muriatic Acid. [HYDROCHLORIC ACID.]

Murie, James, naturalist and traveller, was born in Glasgow on March 30th, 1832. He was educated at Anderson's College and Glasgow University, where he studied medicine. In 1854 he went to Corisco (Gaboon) to report on indiarubber, gums, woods, and other natural products, remaining in the country nearly a year, and living among the races and ascending the rivers afterwards described by Paul du Chaillu. On his return to Glasgow he took the degree of M.D. (1857), and was appointed pathologist to the Royal Infirmary, in succession to Dr. (afterwards Sir) William Aitken, and narrowly missed becoming the naturalist to Dr. Livingstone's second expedition (1858). His bent towards comparative anatomy and natural history—which had been fostered by his parents and matured by his study of Buffon and Cuvier—finally caused him to give up private practice and accept the post of assistant-conservator in the museum of the Royal College of Surgeons in London, then under Professor John Quekett, the microscopist. This post he temporarily vacated in order to accompany, as naturalist, Consul Petherick of Khartum, who was leading an expedition to the equatorial regions of Central Africa. The party ascended the Nile to beyond Fashoda, where they left the river and travelled through the swampy districts of the Bahr-el-Ghazal and among the Niam Niam cannibals and other tribes, but after a great *détour* westwards ultimately succeeded in making Gondokoro, where they met (1863) not only Speke and Grant, who had approached this centre from Zanzibar, but also Sir Samuel Baker, who had followed Petherick but kept to the direct course of the stream. Had not his presence been imperatively required at home at this juncture, Murie would probably have shared Baker's discovery of the source of the Nile, or anticipated Sir H. M. Stanley's explorations on the Congo. Meanwhile a report of the death of the expeditionary party having reached London, Murie's post in the Royal College of Surgeons' Museum was filled (1862) before it was ascertained that the rumour was false. Shortly afterwards the Zoological Society having created the office of prosector, Murie became the first incumbent. It was the prosector's duty to examine and dissect the bodies of all the animals that died in the Gardens at Regent's Park, and report, for publication in the *Proceedings and Transactions* of the Society, the results of the *post-mortem* and such discoveries as might be made in the course of it. Murie's long practical famili-

arity with comparative anatomy, microscopy, and pathology eminently qualified him to conduct such inquiries with thoroughness and success, and many of his monographs were as valuable in their way as the works of similar character by Sir Richard Owen and Sir W. H. Flower. He resigned the prosectorship to fill the chair of anatomy in the Royal Veterinary College, Edinburgh, but, finding the climate too cold, returned to London, where he was soon appointed assistant-secretary and librarian to the Linnean Society. After several years' service he retired to Leigh-on-Sea, Essex, where he pursued his scientific researches with undiminished zest and zeal, and bore a part also in the local government of the town. Murie's chief contributions to popular science were the exhaustive *Report on the Sea Fisheries and Fishing Industries of the Thames*

illustrate this period. In 1660 he established the Academy of Seville, and in 1661 began the pictures for the Hospital de la Caridad. Among his later achievements, which rather lack vigour, are the well-known "Assumption of the Virgin," "St. Peter Weeping," and a portrait of Canon Justino. Besides sacred subjects Murillo painted city Arabs and beggars, many of the pictures of this description being his happiest efforts, as may be seen from the examples in the gallery at Dulwich. He died in Seville on April 3rd, 1682, from injuries caused by a fall from a scaffold in the church of the Capucins in Cadiz while he was painting.

Murphy, ARTHUR, author and actor, was born at Clomquin, Roscommon, Ireland, on December 27th, 1727. After several years at the English



From the painting by Bartolomé Esteban Murillo in the National Gallery.
THE NATIVITY OF THE VIRGIN.

Estuary (2 vols., 1903, 1906) and the articles on the Lemurs, Whales, Seals, and Manatees in *Cassell's Natural History*. In 1877 he received the hon. degree of LL.D. from St. Andrew's University, and is a fellow of the Linnean, Geological, and other learned societies.

Murillo, BARTOLOMÉ ESTEBAN, Spanish painter, the son of humble parents, was born at Seville in 1617. Whilst a child he showed such artistic tendencies that his distant relative, Juan del Castillo, took him into his studio. In 1642 he set out with the idea of visiting Italy and Flanders, but at Madrid fell in with Velasquez, the court painter, who set him to work at copying Ribera, Van Dyck, and himself. Returning to Seville in 1645, he undertook to adorn the walls of the small cloister of the Franciscan convent, and the eleven pictures which he then painted made his name. "The Flight into Egypt," the "San Leandro" and "San Isidoro," the "Nativity of the Virgin," "St. Antony of Padua," and the "Dream of the Roman Senator"

College at St. Omer he returned to London, and was sent by his uncle to serve as clerk to a merchant in Cork. Returning to London, his literary and theatrical aspirations led him, in 1754, on Foote's advice, to become an actor, and he played many leading parts with success. In 1756 his first farce, *The Apprentice*, was produced at Drury Lane, and was followed by a long series of plays, in which Mrs. Siddons, Mrs. Clive, and Garrick appeared. *The Grecian Daughter* is his best-known tragedy, but though so prolific a writer no play of his now holds the stage. He entered Lincoln's Inn in 1757 and, overcoming the opposition of the benchers to an actor being admitted, was called to the bar in 1762, and retired in 1788. He made large sums by his writings, but was always impecunious. A pension of £200 a year was granted to him by George III., but he was seldom free from debt. Yet he was a favourite in society, the friend of Johnson, Garrick, whose life he wrote, Samuel Rogers the banker-poet, and other celebrities. He died at Knightsbridge, London, on June 18th, 1805.

Murray, a term applied to any infectious disease occurring in cattle, particularly to what is known as foot-and-mouth disease.

Murray, the largest of Australian rivers, is formed by the confluence of many streams in the Munlong Range of the Australian Alps in Victoria. For some distance it flows westwards, serving as the boundary between New South Wales and Victoria for almost 600 miles, then passes into South Australia, and, taking a sharp bend to the south, traverses Lake Alexandrina and discharges its waters into the ocean at Encounter Bay. During its course of 1,400 miles to the point where it debouches into the lake, it receives the Murrumbidgee, Darling, Goulburn, Lachlan, and other tributaries, draining an area of nearly 300,000 square miles. The upper portion is broken, uneven, and liable to semi-oblivation in dry seasons, but the lower reaches possess considerable breadth and depth, and are navigable from the lake to Albury, though, owing to the narrow and dangerous mouth, communication with the sea is impracticable for large ships.

Murray, ALEXANDER, linguist, was born at Dunkirk, Kirkcaldyshire, Scotland, on October 22nd, 1775. He was the son of a shepherd, to whom he owed his education to the age of 13, when for a short time he went to school. An omnivorous reader of all books which he came across or could borrow, he pursued his education while still employed, partly as a herd laddie and partly as tutor to children remote from schools, as he was. In this way he not only acquired a knowledge of English literature but also of the classics, of the European languages, and of Hebrew. In 1791 he visited Dumfries, where he met Robert Burns, who gave him valuable advice. His fame led to his obtaining a bursary at Edinburgh, where his studies were continued and extended to Oriental tongues. In 1805 appeared his edition of Bruce's *Travels in Abyssinia*, and at this time, too, he wrote for the *Edinburgh Review*. After a keen contest he was appointed professor of Oriental Languages in Edinburgh University in July, 1812, but died of consumption on April 15, 1813, leaving a *History of European Languages*, which was not published till 1823.

Murray, DAVID, landscape painter, was born at Glasgow on January 29th, 1849. He originally embarked upon a business career, which he abandoned after eleven years, during which period he had studied drawing and painting at the Glasgow School of Art, devoting his early mornings to outdoor sketching. His first painting expedition was made in 1874 to Loch Coruisk, in Skye, and his picture, "Valley of Coruisk," was exhibited at the Royal Academy in the following year. Later, he painted among the islands of the Outer Hebrides, including far St. Kilda. In 1882 he settled in London, taking Millais' old studio in Portland Place. He has painted chiefly in England and Scotland, though he occasionally paid visits to Picardy, Normandy, and Holland. His pictures of Picardy formed one of the early one-man shows at

the Fine Art Society in 1886. His Kentish and Sussex pictures are well known, comprising "Young Wheat," exhibited at the R.A., 1890; "Mangolds," in 1891; "A Summer Day," 1898; and "Old Shoreham," 1898. In 1897 he exhibited at the R.A. "Deeside," and three of a series of pictures of "Hampstead Heath," following them with "The Don abune Balgownie," in 1899. Among his other pictures, "In Summer Time," exhibited 1890, and "Bolton Abbey" 1902, are noteworthy. In 1884 the trustees of the Chantry Bequest purchased "My love has gone a-sailing," painted at Tarbert, on Loch Fyne, and, in 1903, "In the Constable Country." At a time when landscape painting was largely a conventional art, his pictures, which were marked by their appreciation of atmosphere and natural colour, came somewhat as a revelation and immediately attracted attention. In 1904 he was elected a Royal Academician, having been an Associate since 1884.

Murray, DAVID CHRISTIE, novelist, was born at West Bromwich, Staffordshire, England, on April 13th, 1847. He began his career as a journalist at Birmingham, but came to London in 1873. During the Russo-Turkish War he was a war-correspondent for *The Times*. He is, however, most widely known as a writer of fiction, and his long list of novels, which includes "Joseph's Coat" (1881), began with "A Life's Atonement," published serially in *Chambers's Journal* in 1879. In many of his works he collaborated with Henry Herman. He has essayed the drama both as author and actor. In his play, "Ned's Chum," produced at the Globe Theatre, London, in 1891, in which he sustained the part of the villain, he came near to attaining a genuine success in both capacities.

Murray, SIR GEORGE, vice-admiral, was born in 1759, and first went to sea in 1770. During the American War he served at the attack on Sullivan's Island in Charleston harbour in 1776, and in 1779 was taken prisoner of war. During the French War he was ordered to lead the van at the battle of St. Vincent (1797), and later at the battle of Copenhagen (1801). Upon the renewal of hostilities in 1803 he became captain of the fleet under Lord Nelson, whom he accompanied to the West Indies. He subsequently commanded the naval forces in South America and elsewhere, and, having in 1809 attained the rank of vice-admiral, died in Chichester on February 28th, 1819.

Murray, JAMES AUGUSTUS HENRY, lexicographer, was born at Denholm, Roxburghshire, Scotland, in 1837, and educated at schools in Cavers, Minto, and Hawick, and at Edinburgh University. Beginning his career as a teacher in 1855, he became Master of Hawick Academy in 1858, and was appointed to Mill Hill School in 1870. In 1879 he undertook to edit the *New English Dictionary on Historical Principles*, and, in 1885, found it imperative to remove from Mill Hill to Oxford, to give his undivided attention to the claims of his colossal enterprise. Besides several papers contributed to the Transactions of various

learned societies, Dr. Murray is author of *The Dialect of the Southern Counties of Scotland* (1873), and editor of *The Complaynt of Scotland* (1874), and *The Romance and Prophecies of Thomas of Erceuldoune* (1875). He was President of the Philological Society for 1878-80, and 1882-4, and is Hon. LL.D. of Edinburgh and Glasgow, D.C.L. of Durham, and Ph.D. of Freiburg. His brother, Charles Olive Murray, is the well-known etcher.

Murray, JOHN, publisher, was born in London on November 27th, 1778. His father, John Mac-Murray, was a publisher in Fleet Street, and ultimately dropped the "Mac" before his surname. In 1803, ten years after his father's death, Murray acquired the sole control of the business, which he conducted with remarkable enterprise. For several years he was Archibald Constable's London agent, in which capacity he had a share in the publication of *Marmion*, but their relations ceased in 1813. Before this, however, he had started (1809) the *Quarterly Review* in opposition to the older *Edinburgh Review*. In 1812 he moved to his historic premises in Albemarle Street. The year before he had made the acquaintance of Lord Byron, most of whose poems appeared under Murray's auspices. One of his serious failures was the newspaper entitled *The Representative*, which he undertook at the instigation of Benjamin Disraeli, and over which he lost £26,000. His career, however, was exceptionally prosperous and his influence great. He died in London on June 27th, 1843. His son, JOHN MURRAY "THE SECOND" (1808-1892) continued the business with similar vigour and success, and his son, JOHN MURRAY "THE THIRD," still carries it on in a style worthy of the traditions of this now famous house.

Murray, SIR JOHN, naturalist, was born in Coburg, Ontario, on March 3rd, 1841, and educated in Canada, the High School of Stirling, and Edinburgh University. In 1868 he visited Spitsbergen and the Arctic Regions to study the fauna and physical features. From 1872 to 1876 he was engaged in the memorable *Challenger* expedition which explored the biological and other conditions of the ocean basins of the globe. In the following years he was occupied first as assistant and afterwards (1882) as editor of the monumental *Report on the Scientific Results of the long voyage*, which was published at the national expense and completed in 1892 in fifty royal quarto volumes. He took part in other deep-sea investigations, and in the exhaustive survey of the fresh-water lakes of the United Kingdom, and was formerly member of the Fishery Board for Scotland. He was created K.C.B. in 1898, and is F.R.S., member of the Prussian Order pour le Mérite, and holds the Cuvier Prize of the Institut de France as well as numerous awards of the highest class from scientific bodies in Great Britain and other countries.

Murray, LINDLEY, grammarian, was born at Swatara, Pennsylvania, United States, on April 22nd, 1745. He was called to the bar and settled in New York, but went to England in 1770, following his father. Next year, however, he returned to

New York, where his practice soon became lucrative. On the outbreak of the War of Independence he removed to Long Island, where he remained until hostilities were over, when he went back to New York. In 1784 failing health led him to visit England again, and he settled near York, where he died on January 16th, 1826. Although confined to the house for long periods he wrote several religious and educational books, of which his *English Grammar* attained to extraordinary popularity.

Murray, SIR ROBERT, first President of the Royal Society, was born about 1600, being the son of Sir Robert Murray of Craigie, Perthshire. Entering the French army, he reached the rank of colonel, when the Civil War recalled him to Scotland, where he warmly supported the Royalist cause. During Cromwell's supremacy he again retired to France, and actively promoted intrigues in favour of Charles II. At the Restoration he was in high favour, and was appointed Lord Justice Clerk of the Scottish Court of Session (1661), and Deputy-Secretary for Scotland (1663). He also obtained the patronage of the king for the scientific club, which was soon developed into the Royal Society. He died suddenly on July 4th, 1673, and was buried at Charles II.'s expense in Westminster Abbey.

Murshidabad, or MOORSHEEDABAD, a district and its capital in Bengal, British India. The district has an area of 2,141 square miles, and a pop. (1901) of 1,335,374. The Bhagirathi cuts the district in two, the western half being barren for the most part and interspersed with marshes, whilst the eastern portion resembles the alluvial plains of the Ganges valley and bears good crops of rice, wheat, pulse and indigo. Mulberries, too, are grown for silkworms. The city of MURSHIDABAD, once the capital of Bengal, and still the residence of the titular Nawab Nizam, stands on the left bank of the Bhagirathi, 115 miles N. of Calcutta. The trade is even now considerable, and the Jain bankers have extensive financial dealings. Few industries flourish, save ivory-carving, metal-work, and embroidery, fostered by the native court, which has its headquarters in a fine palace on the river. In 1825 the population numbered 150,000, but so steady has been the decline of the town that, in 1901, it was only 15,168.

Musaceæ, a natural order of herbaceous, monocotyledonous plants, tree-like in appearance but lacking a true stem. The species, about twenty in number, belong to tropical countries, to the natives of which they are invaluable alike for food and for textile and other purposes. The banana and plantain are the most familiar examples of the order, while the Traveller's Tree of Madagascar is one of the most interesting.

Mussus, a poet of Greece, of whom little is known, save that he flourished in the 5th century, and left 340 graceful hexameters on the theme of *Hero and Leander*. A legendary seer of the same name existed in Attica five or six hundred years B.C., and is spoken of as the son of Orpheus and the introducer of the *Eleusinian Mysteries*.

Musäus, JOHANN KARL AUGUST, novelist and folklorist, born at Jena on March 29th, 1735, where he studied theology. As he had been known to dance, the townsfolk objected to his becoming their pastor. In 1763 he was made tutor to the pages at the court of Weimar, and in 1770 became a professor at the Weimar gymnasium. His first work was a parody of Richardson's *Sir Charles Grandison*, then a favourite novel in Germany. After a long interval he satirised Lavater, the physiognomist. But his fame chiefly rests upon a series of folk-tales said to have been collected from old people, *Volksmärchen der Deutschen*, a few of which were translated by Thomas Carlyle. They are brightly told and still retain some of their first popularity. Their success led him to continue writing in a satirical vein and he was engaged on a further collection of tales, *Strassfedern*, when he died at Weimar on October 28th, 1787.

Musce Volitantes are the specks which appear to float before the eyes, and which are due to small opacities in the refracting media. Unnoticed, as a rule, by those who have normal sight, they prove a source of considerable trouble in some short-sighted persons during periods of ill health. In rare cases their appearance is associated with some of the more serious affections of the interior of the eyeball.

Muscarine, a poisonous alkaloidal substance which occurs in the fly-fungus (*Agaricus Muscarius*). It possesses the composition $C_6H_{15}NO_2$, and is closely allied to other poisonous and toxic substances, e.g. choline, neurine, etc. Its action on the human system is deadly.

Muscat, or MASKAT, the capital of Oman, Arabia, stands on a narrow inlet on the S. coast of the Gulf of Oman. The site is extremely hot and unhealthy, and the insanitary nature of the locality is increased by dirt and decay; but the convenience of the harbour attracts a considerable trade, the exports being dates, fish, salt, cotton, pearls, and horses, whilst rice, coffee, sugar, and piece-goods are imported. Much of the trade has been transferred to Matrah, a healthier suburb, just outside the bay. The population (estimated at 60,000) is mainly Mohammedan, though many Hindus are among the traders. Owing to the long prevalence of the slave-trade, there is a large infusion, too, of African blood. It is an ancient place, but only rose into importance under the Portuguese (1508-1658). Muscat, which is under British influence, owes its value as a naval base to its situation, which commands the entrance to the Persian Gulf.

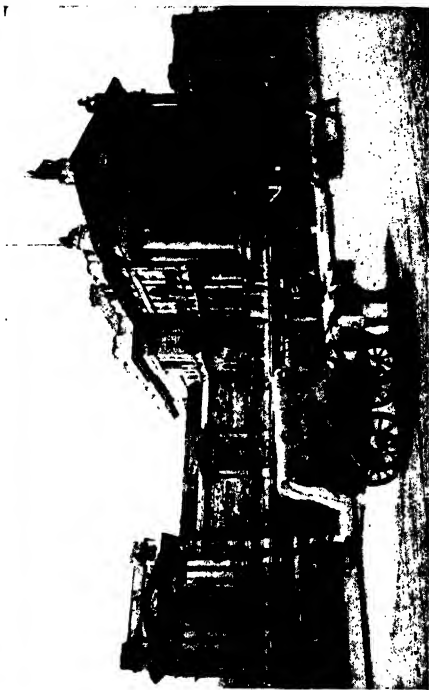
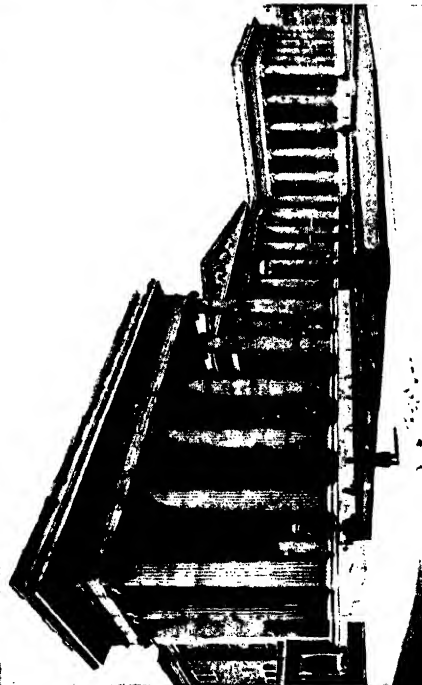
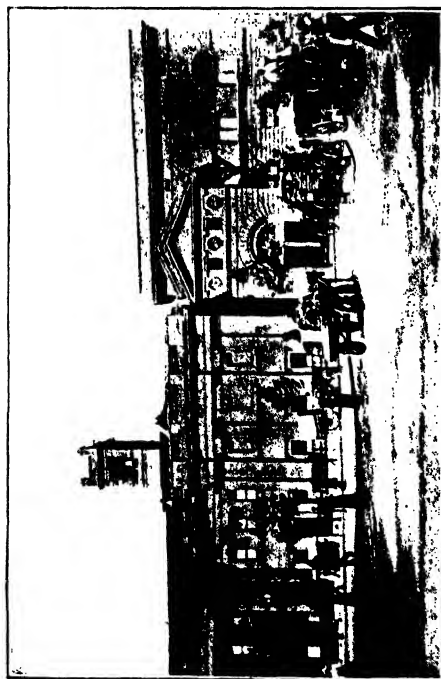
Muscatine, capital of Muscatine county, Iowa, United States, finely situated on the west bank of the Mississippi, at a height of 554 feet above the sea. There are manufactures of lumber, brick, tiles, and pottery, besides flour-mills and iron-works. The district is noted for its melons and sweet potatoes. Pop. (1901), 14,073.

Muschelkalk ("shelly limestone"), the German name for the middle member of the Trias, as developed in Germany, France, and Poland. It is a grey or cream-coloured limestone, sometimes

magnesian, with beds of rock-salt and gypsum, and numerous fossils, among which the most characteristic are the ammonitid *Ceratites nodosus* and the crinoid *Encrinurus liliiformis* "the lily encrinure." The bivalve crustacean *Estheria minuta* and the pelecypod *Gervillia socialis* are also abundant. In France the series is known as *calcaire coquillier*. There are no similar beds in England.

Muscidae, the largest family of Diptera, including most of the common species and nearly half the known species of the order. They are mostly small, the largest European species (*Echinomyia grossa*, Linn.) being only $\frac{1}{4}$ inch long. As a rule their colouring is dark, but some, such as the Australian *Rutulia*, are of a brilliant metallic green. The familiar small house-fly (*Musca domestica*, Linn.) lays its eggs in dunghills; the adult often carries about one of the small parasitic chelifers and is also infested by the mould *Empusa muscarum*. Those attacked by the latter can often be found attached to windows by the fungus. The larvæ of most flies are parasitic on other insects—thus, e.g. those of *Echinomyia grossa* on butterflies, moths—but they attack other animals; thus, the *Sarcophagæ* are parasitic on worms, and the *Sarcophila* on mammals, including man. These lay their eggs in the ears or nose, and the larvæ eat their way into the flesh. The Muscidae are divided into two main groups—*M. calyptera*, in which the wings have a pair of lobe-like appendages (the alulae) well developed; and *M. acalyptera*, in which these structures are rudimentary or absent.

Muscle. The muscles are the contractile tissues of the animal body, and the power of altering their shape which they manifest is the means by which the various movements incidental to respiration, the circulation of the blood, etc., and the alterations of the position of the various parts of the skeleton with respect to other parts are brought about. There are three kinds of muscle. Unstriated muscle is also called involuntary muscle, as it is concerned in those movements which are not regulated by the will, e.g. contraction of the bladder, alterations in the calibre of blood-vessels, etc. Unstriated muscle is made up of spindle-shaped nucleated cells, which are grouped in bundles, and these again may be aggregated together in the form of a membrane, such as occurs in the muscular coat of the bladder. Heart muscle is intermediate in character between the unstriated and the striped variety; though it contracts apart from the influence of the will, it resembles to some extent the ordinary voluntary muscle; it possesses some degree of striation when seen under the microscope, but the fibres are branched; they possess no distinct limiting membrane, and the nucleus is situated in the body of the fibre. Striated, or ordinary voluntary muscle, is made up of fibres which possess a limiting membrane, the sarcolemma, and immediately beneath this membrane, lying external to the main body of the fibre, there is found here and there a nucleus. When examined microscopically the fibres are seen to possess a distinct transverse striation, due to the muscle fibre possessing alternately-arranged dim and bright bands; this appear-



(1) NATIONAL PORTRAIT GALLERY: FROM ST. MARTIN'S PLACE.
(3) BRITISH MUSEUM.

(2) NATURAL HISTORY MUSEUM, SOUTH KENSINGTON.
(4) NATIONAL GALLERY OF BRITISH ART (TATE GALLERY).

ance is more markedly developed in the muscles of certain invertebrates, particularly insects, than it is in man. Chemically, muscle consists of certain proteid substances, extractive bodies (kreatin, etc.), salts and water. The chief proteid of muscle is a body known as myosinogen. When a muscle is removed from the body it dies and undergoes what is known as *rigor mortis*—that is to say, it becomes stiff and rigid—this change being accompanied by the development of an acid reaction, and by the conversion of the myosinogen of the living muscle into myosin. This alteration of the muscle substance is closely analogous to the phenomenon of coagulation in blood, and myosin is nearly allied in composition to fibrin. The changes which occur when a muscle contracts have been attentively studied. It is found that heat is developed, sound is produced, certain changes in the microscopical appearance of the fibre occur, there is an evolution of carbonic acid gas, a taking-in of oxygen and the development of a body known as sarcolactic acid, and lastly there is an alteration in the electrical condition of the muscle, what is known as a current of action being developed.

Muses, in Greek mythology, were goddesses who inspired poets and protected art, letters and science. They were nine in number—Calliope, the muse of epic poetry; Clio, of history; Melpomene, of tragedy; Thalia, of comedy; Euterpe, of lyric poetry; Erato, of erotic poetry; Polyhymnia, of the sacred hymns; Terpsichore, of choral song and dance; and Urania, of astronomy. They were usually represented as the daughters of Zeus and Mnemosyne (Memory.) The chief seats of their worship were Mount Olympus in Thessaly, with the district of Pieria, which lies North of it, and the neighbourhood of Thespie and Ascrea on Mount Helicon.

Museum (Greek ΜΟΥΣΕION). The term was originally applied to a part of the ancient palace of Alexandria, occupying one-fourth of the city, which was set apart as a shrine of the Muses, and for the study of the sciences. Later a museum came to be known as a special repository for objects having an immediate relation to the arts. Finally, the fine arts themselves were included under the title, which is now applied to most of the Continental art galleries as well as to those places which are museums in the older sense of the word. The Palace of Alexandria was the earliest museum known, its foundation being attributed to Ptolemy Philadelphus a little before 300 B.C. The earliest British museum was the Ashmolean at Oxford, which was finished in 1683. Until the 19th century inaugurated what was known as the museum movement, the so-called museums in Great Britain were mostly collections of archaeological and artistic curios, dependent for their maintenance on private patrons and lacking the systematic arrangement that now renders them of such great educational value. By the Museums Act of 1845, however, town councils were enabled to found and maintain them, and subsequent legislation still further strengthened the hands of municipal authorities. The Museums and Gymnasiums Act of 1891 allowed

a $\frac{1}{2}$ d. rate irrespective of other Acts. Concurrently with these developments the need of definite and scientific organisation of the objects displayed made itself felt. The International Exhibition of 1851 made history by giving an enormous impetus to the museum movement. One of the direct results was the purchase of a site of 12 acres in South Kensington, London, out of the surplus funds of the Exhibition, and the erection thereon of the Victoria and Albert Museum. The latter is controlled by the Board of Education, and the same body has charge of the museum at Bethnal Green, and indirectly of those at Dublin and Edinburgh. Municipal museums of industry and art are to be found in practically every capital. A modern development, too, is the number of museums designed to perpetuate the memory of a particular notability, such as the Shakespeare Museum at Stratford-on-Avon, the Burns Museum at Alloway, near Ayr, the Beethoven at Bonn, and the Michael Angelo at Florence. In the United Kingdom the British Museum (q.v.) and the National Gallery in Trafalgar Square, both in London, are the most important. The Victoria and Albert, already referred to, contains many objects of industry, but its aim is to illustrate more particularly the development of the fine and applied arts, and to circulate examples throughout the country. From time to time it has been enriched by various loans and bequests. The famous Raphael cartoons are lent by the Sovereign. In 1857 the Sheepshanks collection of pictures was presented, and in 1882 the Jones bequest of French furniture and decorative arts. The Dyce and Forster bequests of books and MSS., the Constable and Schreiber collections, and the Ionides collection of pictures go towards making this one of the most notable of the world's museums. There is, too, a magnificent art library for the use of students, consisting of 75,000 volumes and 250,000 prints and photographs. In 1900 the Wallace collection of pictures, furniture, and *objets d'art* at Hertford House, London, was thrown open to the public; and the Tate Gallery and National Portrait Gallery are institutions of the first rank. More particular in their scope, the Soane Museum in Lincoln's Inn Fields, London, the Greenwich Hospital Museum, and the Museum of Practical Geology in Jernyn Street, London, are of immense interest to students, and outside London the majority of large towns have their museums, either attached to art galleries or in separate buildings, the FitzWilliam at Cambridge being housed in the finest example of the Corinthian order in the United Kingdom.

On the Continent, the Louvre Museum in Paris, the Ryks in Amsterdam, the Royal Museums and National Gallery of Berlin, the Prado in Madrid, the Hermitage in St. Petersburg, the Uffizi and the Pitti Palaces in Florence, the Vatican in Rome, the Venice Gallery of Ancient Art, the Munich National Museum, the Plantin Museum in Antwerp, and the National Museum of Denmark at Copenhagen, are the most famous names that occur. France is particularly fortunate in her museums, every provincial town of any size possessing one that contains at least a few important objects of interest. The

Louvre, in Paris, founded during the Revolutionary period, includes the collections of Francis I., Louis XIV., and the Napoleons, and is pre-eminent for its collection of Greek sculpture, embracing such examples as the Venus of Milo and the Nikè of Samothrace. The Salle Rubens, in commemoration of the achievements of Catherine de' Medici, is one of its many pictorial features. Paris can also boast in the Hôtel Cluny a unique museum housed in an old building of remarkable charm. The Ryks Museum (1877-85) at Amsterdam is the most important in Holland, though there are excellent museums of art and antiquity at The Hague, Rotterdam, and most of the provincial centres; these, however, are subordinated to the Ryks, which contains the finest collection of Dutch pictures in the world, including Rembrandt's masterpiece, the so-called "Night Watch," and also a library, engravings, armour costumes, and metal-work. Berlin has two fine art museums, the older being a royal foundation renowned for its classical sculpture, and the newer famed for its typical collection of Egyptian art. There are also the National Gallery and a Museum of Art and Industry corresponding to the Victoria and Albert Museum in London. In Munich, which is the principal art centre of the German States, the Bavarian National Museum illustrates the history of civilisation and art; the Glyptothek Gallery of Sculpture (1816-1830) includes the famous Æginetan Marbles. The Historical Museum of Alexander III. is to be found at St. Petersburg. Here, too, is the magnificent Hermitage Gallery, which contains many superb examples of Russian and Western art, and a collection of Greek and Seythian antiquities. Though good art collections have been formed in Russia, with the exception of those at St. Petersburg and Moscow, they only consist of native art. Italy is still *facile princeps* in artistic wealth. The famous Laocoon and Apollo Belvedere are in the Museo Clementino, one of the six museums of the Vatican. The Niobe group is in the Uffizi Palace, Florence, and this gallery, together with the Pitti Palace and the Venice Gallery of Ancient Art (founded by Napoleon I.), contain the masterpieces of Raphael, Titian, Veronese, and Carpaccio. A feature of the Uffizi Palace is a gallery devoted to portraits of artists by their own hands. Roman art is the speciality of the Museo Nazionale at Naples (1790). The Real Museo de Pinturas at Madrid, familiarly known as the Prado, which was founded in 1785 as a museum of natural history and academy of sciences, contains the collections of Charles V., Philip II., and Philip IV.—upwards of 2,000 pictures by Velasquez, Murillo and others. The National Museum of Denmark at Copenhagen, built in 1744, has the reputation of being the second national museum in the world. In Greece, Athens has three museums devoted to Greek art; local museums scarcely exist in this country, as the State owns all discoveries. In the United States the great museum at Washington (1876) is distinguished for its historical relics of America, and the Metropolitan Museum of New York (1879-98) for Cypriot art objects and paintings, while the Boston Museum of Fine Arts is another well-known institution.

Mushet, DAVID, metallurgist, was born at Dalkeith, Midlothian, Scotland, on October 2nd, 1772. From 1792 to 1800 he was employed at the Clyde Iron Works, where he obtained a complete knowledge of every branch of the manufacture of steel and iron. In 1801, whilst engaged in the erection of the Calder Foundry, he discovered that the blackband iron-stone, hitherto regarded as of little or no account, was economically valuable, a fact of instant importance to miners and founders. In 1805 he moved to Alfreton, Derbyshire, and in 1811 to Coleford, Forest of Dean, and died in Monmouth on January 13th, 1847. His chief inventions related to the preparation of steel from bar-iron by a direct process, to the extraction of iron from cinder, and to improvements in the process of puddling iron.

Mushet, ROBERT FORESTER, metallurgist, was born at Coleford, Forest of Dean, England, on April 8th, 1811. For many years he assisted his father, David Mushet, in carrying out various experiments, and, in 1848, discovered that spiegel-eisen, an alloy of iron and manganese, had the property of restoring the quality of wrought-iron that had been damaged by too much exposure to heat. This discovery was of enormous consequence to the easy and cheap working of the Bessemer process. Considerable discussion arose as to the priority of the discovery, though Mushet, while claiming that he did actually anticipate him, conceded that Sir Henry Bessemer would, in all probability, have made the discovery also. Honours were "easy" when, in 1876, the Bessemer medal of the Iron and Steel Institute was given to Mushet with the founder's sanction. Others of his discoveries had to do with the manufacture of alloys of iron and steel with different metals, that with tungsten yielding a "special steel" with the remarkable property of self-hardening. He died at Cheltenham on January 19th, 1891.

Mushroom, the cockney pronunciation of which, "musheroon," more nearly represents its French original *mousseron*, is the name popularly applied, in contradistinction to that of "toadstool," to all edible forms of agaric. It belongs strictly to *Agaricus campestris*, a species growing in short grass on open breezy pastures grazed by cattle, in all temperate regions. It has a firm stalk, enlarged below and pithy, but not hollow in the centre; a cloth-like fixed ring (*annulus*) near the middle of the stalk, derived from the rupture of the veil (*velum*) of the "button-mushroom"; a firm, fleshy cap (*pileus*), not more than four or five inches across; numerous gills, free from the stalk, first flesh-pink and afterwards purple-black; and a dry, sometimes flocculent, and separable upper skin or cuticle. There are several varieties or closely allied species, as edible, if not as delicate. The horse-mushroom (*A. arvensis*), a larger coarser species, growing in meadows or damp places, is largely brought to market. Perhaps the most dangerous allied form is *A. fastibilis*, with straight, almost ringless stalk, clammy surface, and brownish gills adherent to the stalk, which sometimes appears on mushroom beds. Immense quantities of mushrooms

are grown in underground caves near Paris, miles in extent, the fungi being gathered in a small immature condition. In England they are cultivated on a smaller scale, either in the open or in dark sheds. Mushrooms are indigestible in a raw state, and dangerous if at all decayed. Poisoning from mushrooms or toadstools is generally of a narcotic character, producing drowsiness and pains in the joints. Pending the arrival of medical assistance, sweet oil may be administered as a safe palliative and emetic. It is in allusion to the extraordinarily rapid growth and insubstantial nature of these fungi, that the word "mushroom" is often applied to persons, classes, towns and institutions, in the sense of upstart and sham.

Music is the art which aims at the realisation of an idea of beauty through the medium of pure sound. Unlike the so-called representative arts, it looks to nature for its medium only, not for its model. It offers nothing analogous to the criticism of life which has been regarded as the chief function of poetry, or to the truths of nature which find their most direct expression in painting; its criterion is wholly internal, and its validity depends not on its correspondence with any parallel in outward experience, but on its conformity with psychological laws. In its conception, as Schopenhauer says, "it is entirely independent of the phenomenal world, ignores it altogether, and could, to a certain extent, exist if there were no world at all." Hence, it is essentially a creative art in which the idea is presented to us, as it were, at first hand. Its chief requisite, therefore, is originality in the composer, whose thought, if it be not the genuine outcome of his own character, must necessarily be a plagiarism from his predecessors. The same event may be treated by different poets, or the same scene by different painters, all of whom can claim the first rank in virtue of their form; but in music thought and form are identical, and the interpretative side of art is wholly absent. Thus, in criticising the form of music, we are discussing not the embodiment of the art, but the art itself; and we may therefore classify its entire effect upon us under three heads, corresponding to the three psychological divisions of sense, emotion, and intellect.

(1) The sensation of sound is, on its material side, due to an affection of the auric nerve, under stimulus of regular and periodic air-vibrations. By the rapidity of these vibrations is determined the pitch of the sound, that is, the distinction of high and low; by their size or volume the degree of the sound, that is, the distinction of loud and soft; and by their shape the *timbre* of the sound, that is, the particular voice or quality by which we distinguish the tones of different musical instruments. Again, a sound will be pleasurable or painful, according to the degree in which it stimulates the auditory organs; and, as these may, in different organisations, exhibit an almost infinite variety of sensitiveness, it follows that no dogmatic rule can be formulated as to what sounds are capable of giving pleasure or the reverse. This is particularly true of those composite vibrations

which result from several notes combined in harmony. The terms "concord" and "discord" in musical science are restricted to a purely technical meaning, which explains their grammatical relations, but makes no more than a temporary allusion to their aesthetic effect. Chords which, at the present day, are regarded as specially pleasurable, have in past ages been condemned as intolerably harsh and dissonant; and we may therefore infer that the process of development which has brought about our own change of taste will continue to extend in future generations. If by discord we mean "that combination of sounds on which the ear is unable to rest with pleasure," it is obvious that the term must be relative to the qualities of the ear as well as to those of the air vibrations by which it is affected.

(2) Through the senses music makes a further appeal to our emotional nature. Professor James has shown, in his *Principles of Psychology*, that our emotions are largely dependent on the physical conditions of the nervous system; and it is certain that, among the conditions mentioned, an important part is played by those which follow the sensation of sound. But music is not sufficiently definite to describe or evoke emotional states with any precision or exactitude. It can suggest general types of joy or sorrow, of quiescence or agitation, but it can no more specify their particular subdivisions than it can narrate actual events or depict actual scenes. Again, the receptivity of the emotional faculties must necessarily differ with different organisations, so that the same musical phrase which suggests terror to one may rouse merely a passing interest in another, and a phlegmatic hearer be left cold by an effect which stirs a more nervous temperament to a high pitch of excitability. Thus it is as impossible to criticise music in terms of emotion as in terms of sense. The criterion is too transitory in duration and too subjective in character to afford any certain basis for judgment; it is a statement of personal experience in the auditor rather than a scientific estimate of the composition.

(3) Thirdly, music appeals to the rational faculty in man, and it is by this appeal that its true validity as an art is determined. Truths of reason do not vary with various individuals, they hold good for all intelligences, and the ultimate characteristics of intelligence are the common inheritance of humanity. Thus, the claim of music to be regarded as something more than an "art of pleasure" rests on its conformity with the laws of mind. The greatest composers—such as Bach, Beethoven, and Brahms—are greatest because, with a full command of sensuous and emotional effect, they have always regarded the intellectual laws as paramount; and similarly the permanent value of a composition will be found proportionate to the degree in which its intellectual laws have been observed; to those qualities of style and structure which exhibit the most satisfying perfection of balance and symmetry. It must be remembered that such an estimate is not mechanical, since in music imperfection of form means imperfection of thought; the two cannot be set in antithesis, for they are naturally indivisible.

Music, like everything else which admits of growth and progress, is in its highest development an organism, definite, coherent, and heterogeneous. By the first of these words we mean that a musical composition must be certain in its outline and clear in its structure, formed on a general plan as intelligible as that of a great poem or a great picture. By the second we mean that the different parts or factors, of which the structure consists, must be so arranged as to give an impression of unity in the whole; that there must be no otiose digressions and no "passages which lead to nothing." By the third we mean that these parts or factors must not present a monotonous similarity of character, but must supplement each other by adjustment of diverse shapes and diverse functions. A salient example may be found in Beethoven's Seventh Symphony, which displays these three qualities in a very high degree. It is a work of the greatest complexity, rich in surprises and contrasts, maintaining a full measure of variety and interest, yet its elements are so completely unified that it does not contain an unnecessary phrase or a superfluous modulation. Finally, it may be added that these principles of organic structure can be manifested no less in a simple melody than in an elaborate composition. The intellectual excellence of all music may be summed up as unity amid diversity.

Of Greek music we can ascertain but little, except that it consisted of unharmonised melody, or rather recitative, founded, during its best period, on certain diatonic groups of eight notes which were afterwards known as modes. These modes were systematised for church use by St. Ambrose and St. Gregory, from whose time to the end of the 16th century the chief development of music was due to ecclesiastical influence. There are two noticeable points of interest in this period: first, the growth of harmony, and more especially of counterpoint; secondly, the elaboration of the mass and the madrigal. The chief names are those of Dunstable, Dufay, Josquin, Orlando di Lasso, and Palestrina. The death of Palestrina in 1594 was a fatal blow to the established system, and in 1600 the Florentine revolution, under Peri, struck out a new direction by the invention of opera. The same year witnessed, in Rome, the first appearance of the "sacred music drama," which received afterwards the name of oratorio. These new types of composition, besides developing the dramatic and poetic side of music, did much to advance melody and to fix the form of the modern scale. The work was carried on from different standpoints by Alessandro Scarlatti, Lulli, Purcell, Handel, and Gluck; while at the same time the fugue-form was brought by J. S. Bach to a pitch of perfection which it has never since surpassed. The improvements in musical instruments—especially the violin family and the pianoforte—prepared the way for a more artistic scheme of instrumental music, and the generation which followed Bach saw the development of the sonata, the quartet, and the symphony, materially aided by Haydn and Mozart, and culminating in Beethoven. At the beginning of the 19th century was inaugurated the

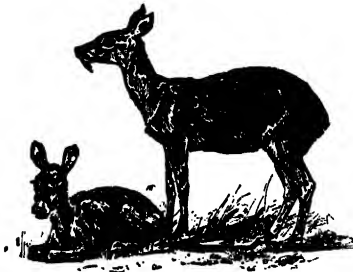
romantic movement, the avowed object of which was to enlarge and extend the bounds of musical expression. Its chief adherents, Weber, Schubert, Schumann, Spohr, and Chopin, made few, if any, important contributions to the existing types of structure, but they did much to enrich the art on its emotional side. Mendelssohn, though related to the romantic school, cannot be accurately described as a member of it. The last epoch in the history of pure music has seen the re-establishment of the ideals of Beethoven, which during the romantic movement had fallen into comparative disregard. This work of reconstruction has been almost entirely due to the genius of Brahms, to whom the next school of composition must necessarily look for its point of departure. Finally, the reform of the opera, under Richard Wagner, has carried out to their logical conclusion the principles of Peri and Gluck, and has put upon the stage a form of music-drama in which all arts are laid under contribution for the furtherance of a dramatic idea. Wagner, however, is less a composer than a dramatist, and the discussion of his work lies at the extreme verge of musical study.

Musical Box, or SNUFF-BOX, an elaboration of a fashionable eighteenth-century toy. This ingenious invention belongs to the early part of the 18th century, and came probably from Switzerland. The teeth of a steel plate brought into contact with a pin-studded cylinder, automatically play musical airs. The working power is a spring, and the mechanism resembles the works of a watch. On the length and breadth of the teeth the pitch of the notes depends, the longer teeth giving the deeper tones. When the revolution of the cylinder is complete the air is ended, but by an ingenious contrivance the same cylinder combines several melodies, and additional cylinders may be applied to the same set of teeth, whereby the repertory is extended. Combinations of effects have been devised, and drums, cymbals, &c., add to the attractions of the instruments. Geneva is the headquarters of the trade in musical boxes, and their manufacture gives employment to a large number of persons. To the United States we owe the invention of perforated paper-music. The same principle is adapted to specially constructed instruments, the most recent development of which is the automatic pianoforte-player. But the most elaborate evolution from the little musical-box is that by which the effects of an orchestra are obtained—often for a penny in the slot.

Musical Glasses or HARMONICA. The earliest form of this instrument for producing musical notes from glasses belongs to the middle of the 17th century, and was used at Nuremberg. On April 23rd, 1746, Gluck, at the Little Theatre in the Haymarket, London, played "a concerto on 26 drinking glasses tuned with spring water, accompanied with the whole band, being a new instrument of his own invention." Musical glasses became fashionable. Benjamin Franklin visited London in 1757 and devised an improvement. He ranged a series of bell-shaped glasses, the lower edges being dipped in a trough of water, on an

iron spindle which was revolved by a treadle. The sounds were produced by the fingers touching the wet rims. The deeper notes were on the left of the player, and the scale ascended on the right, the pitch being due to the size of the glasses. Franklin presented his new instrument to Marianne Davies, who won a European reputation as a performer. Mozart and Beethoven both composed for the harmonica, but though still admired abroad, it failed to maintain its popularity in England. This may have been due to the bad effect it is said to produce on the nerves of the player, no substitute having been found for the human finger.

Musk-Deer (*Moschus moschiferus*), an aberrant artiodactyle ruminant from the mountainous parts of Central Asia, constituting a subfamily of Cervide (deer), or in some classifications a distinct family. The limbs are long, the ears large, the average height at the shoulder is twenty inches, the coloration greyish-brown, becoming paler in



MUSK-DEER.

winter, and the long coarse hair is very brittle. They are generally met with singly in rocky places. Neither sex bears antlers; the upper canines of the male are abnormally large, and curve downwards below the under-jaw. These animals are hunted for the musk of commerce, which is secreted by the males in a pouch in the abdomen.

Musk-Duck, a popular name for *Cairina moschata*, from Brazil and Paraguay, and *Biziura lobata*, from Australia, on account of the musky odour of the males. The former is often wrongly called the Muscovy Duck.

Muskegon, capital of Muskegon county, Michigan, United States, on the Muskegon, four miles from Lake Michigan. Between the town and the lake the river is so wide that it is called Lake Muskegon, and forms the best harbour on the eastern shore of Lake Michigan. Besides iron-foundries, engineering works, and saw mills, the leading manufactures are flour, paper, furniture and pianos. Pop. (1900), 20,818.

Musket, a smooth-bored, muzzle-loading small-arm, from which has slowly developed the modern rifle. The first British musket was the flint-lock that was famous as "Brown Bess." In Wellington's day it weighed 11 lbs. 4 oz., and was 4 feet 6½ inches long without, and 6 feet long with, its bayonet. The powder charge was 164 grains; the

bullet weighed 483 grains, and each man carried 60 rounds of ammunition and three flints. "Brown Bess" remained in the service till 1842, when the percussion musket followed. The only difference was the substitution of the percussion for the flint-lock, and the consequent reduction of the weight of the musket by 4 oz., although at the same time the weight of the bayonet was increased by 6 oz. Muskets of this pattern remained in use, except in rifle regiments, throughout the British army until 1851.

Muskhogan, one of the stock races of North America, whose domain originally comprised nearly the whole of the present states of Georgia, Alabama, and Mississippi, with parts of Florida and west Tennessee, that is, most of the region between the Atlantic and the lower Mississippi river, and from the Gulf of Mexico to about 36° N. The group takes its name from the Muskogi (Maskoki), called Creeks by English writers, who were the chief tribe of the Creek confederacy. [CREEKS.] The other members of the family were the Chickasaws, Choctaws, and Seminoles, nearly all now in Indian Territory, with a total population of over 30,000, besides the extinct or nearly extinct Alibamu, Apalachi, Kousati, Yamacraw, and Yamasi.

Musk-Ox (*Oribos moschatus*), an aberrant member of the Ox family, with affinities to the sheep, as its generic name denotes. It is about the size of a small Highland ox, with brown hair nearly a yard long and woolly under-fur (shed in summer). The horns are broad at the base and



MUSK-OX.

somewhat like those of the Cape Buffalo. Musk-oxen are found in small herds in the western hemisphere between 60° and 83° N. They feed on grass, moss, lichens, and the young shoots of the willow and pine. No special musk-gland is known to account for their musky odour.

Musk-Shrew, a name given to certain shrews from their musky odour. Those of Europe, also called DESMANS, constitute the genus *Myogale*, and are aquatic animals of rat-like form, with webbed feet and compressed scaly tail, which serves as a swimming organ. The snout is produced into a flexible proboscis, with which they probe the mud for their food—leeches, worms, and insect larvae. The Pyrenean Desman (*M. Pyrenaica*), about eight inches long, with a tail as long, has chestnut fur;

the Common Desman (*M. moschata*), from southern Russia is much larger. Both are taken in large numbers for their skins, which are of commercial value. The Indian Musk-shrews belong to the genus *Crocidura*, and their musky secretion is so strong that it is said they can infect liquor with a musky taste by merely passing over the bottle. Musky wine and beer are met with in India, but Jerdon thinks this is caused by these animals infecting the corks before they are used.

Muslin, a thin, fine, woven cotton fabric, the making of which originated at Mosul (whence its name). It was in great demand in the East Indies (where muslins of extraordinary tenuity and lightness are still woven, especially at Decca), and was introduced into Scotland in 1780. The manufacture of muslin is now an important industry in Great Britain and France. Muslins may be plain, figured, embroidered, colour-woven, or printed.

Musquash (*Fiber zibethicus*), a large vole-like aquatic rodent ranging in North America from Ito Grande to the Arctic regions. The head and body are about a foot long, and the scaly tail nearly as much more. The fur—to obtain which large numbers are taken yearly—is amber-brown above and grey below. In summer they burrow in the banks, and in winter build dome-like dwellings of sedge and grass plastered with mud. They swim and dive well and feed on aquatic vegetation. Musk-glands are present in both sexes.

Mussel, the popular name of the Mytilida, a family of bivalve molluscs or "shell-fish." The Sea Mussel (*Mytilus edulis*) is important as bait and, though in less esteem than the oyster, is used as an article of diet. It moors itself to stones, piers, bridges, piles, and the like, by a strong, coarse, yellowish byssus or thread. The Horse Mussel (*Modiolus modiola*) has the habit of burrowing and is found from low water to 100 fathoms. It is never employed for food. The Date Shell (*Lithodanus*) occurs in the Mediterranean, where it is eaten. It perforates limestone cliffs, and the marks left by the creature in bygone ages in the columns of the temple of Serapis at Pozzuoli, near Naples, are conclusive proof of a change of level in the coast within modern times. The River Mussel (*Unio margaritifera*), of the Unionida family, met with in streams in Scotland, supplies the British pearls and is largely used as bait. The edible mussels are readily affected by poisonous waste products, often to a dangerous degree, and the utmost care must therefore be observed in their use.

Musselburgh, a town of Mid Lothian, Scotland, 6 miles E. of Edinburgh, at the mouth of the Esk, which divides it from Fisherrow. The river is spanned by a Roman footbridge still in excellent preservation. The chief manufactures comprise paper, nets, leather, sail-cloth, and oil-cakes. It is the site of Loretto School and Pinkie House, where the wounded in the battle of Pinkie (1547) were tended, and has a quaint tolbooth in the High Street. David Macbeth Moir ("Delta") the author of *Mansie Wauch*, and John Burnet, the painter and

engraver, were natives. The links, on which a race-course has been laid down, are more celebrated for golf. About one mile to the south, beautifully situated on the heights above the stream, is Inveresk, where Alexander Carlyle ("Jupiter") was parish minister from 1748 till his death in 1805. Pop. of Musselburgh (1901), 11,764.

Musset, LOUIS CHARLES ALFRED DE, poet, was born in Paris on December 11th, 1810, and educated at the Collège Henri IV. He early translated De Quincey's *Opium-Eater* (1828), and contributed verses to provincial papers in 1830. His first distinguished volume, *Un Spectacle dans un Fauteuil*, appeared two years later. In 1833 he joined the staff of the *Revue des Deux Mondes*, publishing in its pages *Rolla* (1833), *André del Sarto* (1848), and *Les Caprices de Marianne* (1851). His intimacy with George Sand followed, and resulted in the Italian tour with the quarrel that ended their *liaison*. In 1835 appeared *Lucie*, *La Nuit de Mai*, *La Nuit de Décembre*, and other poetic effusions, and, in prose, *Les Confessions d'un Enfant du Siècle* (1836). In 1850 he collected his poems into a volume, which placed his reputation on so firm a basis that he was elected two years later to the Academy. He died in Paris on May 2nd, 1857.

Mustard, the sub-genus *Sinapis* of the cruciferous genus *Brassica*, distinguished by its spreading sepals. It includes several British species, among which are *B. nigra*, the black mustard, and *B. alba*, the white mustard, differing, among other characters, in the colour of their seeds. The seedling plants of *B. alba* are eaten with cress as a salad. It is cultivated in Essex and Cambridgeshire, as is *B. nigra* in Lincolnshire and Yorkshire, for its seeds. The pungency and odour of mustard are due to the action of an albuminoid ferment myrosin, occurring in both species, in the presence of water upon other principles which they contain. These are sinigrin ($C_{10}H_{18}KN_2SO_{10}$) in black mustard, and sinalbin ($C_{30}H_{44}N_2S_2O_{16}$) in white. In the former case the volatile essential oil of mustard is developed; but in the latter another non-volatile but equally rubefacient compound results. The use of mustard, both as a condiment and in medicine, dates at least from the time of Hippocrates. The seeds are now crushed and the flour is sifted from the husk. It is very commonly adulterated with flour, turmeric being added to preserve its yellow colour. The seed of the Indian species, *B. juncea*, is largely imported. The oil expressed from this species, known as mustard-seed oil, is employed in India in cooking and for lamps.

Mustard Oils. The volatile oil obtained from mustard seeds consists chiefly of a compound known as allyl isosulphocyanide C_3H_3CNS . The name, however, was extended to the whole class of compounds which contain the group CNS , and which closely resemble ordinary mustard oil in their generic properties. This compound is a liquid which boils at $151^\circ C.$, possesses a disagreeable smell, and blisters the skin. It has acquired

additional interest owing to its producing the phenomenon, which is known in photography as reversal.

Mustelids, a family of Bear-like Carnivora, with three sub-families, of which the types are the Badger, Otter, and Weasel.

Musulmān, the Persian form of the Arabic *Muslim*, transliterated also *Moslem*, one who professes submission (*islam*) to the Mohammedan faith; a follower of Mohammed. The plural is Musulmans (not "men," which is obviously ridiculous).

Mute, (1) a clip or weight of brass, hard wood, or ivory used to modify the tone of the violin and other stringed instruments by slipping it over the bridge; (2) a pear-shaped leather pad, placed in the bell of a trumpet or other wind instrument to deaden the sound.

Mutiny, in a naval or military sense, active disobedience to, or revolt against, authority, or the use by persons in the naval or military service of traitorous or disrespectful words against the sovereign or members of the royal family. The punishments for various mutinous acts are prescribed in the Articles of War. Mutiny, in a more general sense, means unlawful resistance to any constituted authority, especially at sea.

Mutiny Act. [ARMY.]

Muttra, a district and its capital in the North-West Provinces of British India. The district occupies an area of 1,453 square miles along the banks of the Jumna, being bounded on the S. by Agra, on the N. by Aligarh and Gurgaon, on the W. by Bhartpur, and on the E. by Manipuri and Etah. The surface, except in the south-west, is uniformly level. The agricultural products are scanty, although the soil towards the east is remarkably rich, but enough is grown in the way of cereals, pulse, and cotton to keep the population, almost entirely Hindu, in fair prosperity. The climate is liable to great extremes, and the Jumna, sometimes an expanse of mud, sometimes a widespread flood, adds to the general unhealthiness. The central portion of the district is one of the most sacred spots in India as being the home of Krishna, the favourite Hindu god, and Balarama, his brother. Here, too, Buddhism took its rise. Pop. (1901), 763,221. The city of MUTTRA stands on the right bank of the Jumna, 30 miles above Agra. Its antiquity must be considerable, and even in A.D. 400 it was an important Buddhist centre. For this reason the Mohammedan conquerors more than once laid a heavy hand on the place, and destroyed many temples and monasteries, but it is still the goal of thousands of pilgrims. The British cantonments lie outside the city. Pop. (1901), 60,042.

Muzaffarnagar, capital of the district of the same name, Meerut division of the North-West Provinces, India, 70 miles N. by E. of Delhi, 790 feet above the sea. Its principal trade is in agricultural produce. It was founded in 1633 by a son of Muzaffar Khan Khanjahan in the reign of the

Emperor Shah Jahan. Pop. (1901), 23,444. The DISTRICT has an area of 1,658 square miles. The chief crops are wheat, pulse, cotton and sugarcane. Pop. (1901), 877,984.

Muzaffarpur, capital of a district of the same name, Patna division of Bengal, India, on the right bank of the Little Gandak, 30 miles N. by E. of Patna. It is a clean, well-constructed town, with large bazaars, where markets are held daily. Pop. (1901), 45,617. The DISTRICT has an area of 3,003 square miles. The land in the north is marshy, in the centre low and liable to inundation, and in the south mostly high and somewhat undulating, the soil consisting of rich mould and sand. The leading manufactures are indigo, saltpetre, opium and tobacco. Pop. (1901), 2,746,009.

Mya, a genus of bivalve shells containing *M. arenaria* and related species. *M. Arenaria* is the common clam of most parts of America.

Myall, the Australian acacia, of which there are several varieties. The trees furnish a hard, scented wood, much used for tobacco-pipes and by turners. From its fragrance the Victorian Myall (*A. homalophylla*) is popularly known as violet wood. The timber of *A. acuminata* of West Australia, which has a raspberry scent, makes durable posts and good charcoal. The wood of *A. glaucescens*, though prettily marked, is less fragrant.

Mycelium, the vegetative part of a fungus, serving similar physiological purposes to roots in attaching the plant to its substratum and in taking in nutriment. Its typical form is that of branching filaments (hyphæ), with or without transverse partitions, sometimes in parasitic forms, putting out minute sucker-like branches (haustoria) which penetrate the cells of living host-plants. Resting reserve-stores resembling tubers, and known as sclerotia, with thickened external walls, occur on some mycelia, as in ergot. In other cases, such as *Agaricus melleus*, thick mycelial strands, or "sclerotia with growing points" are formed, which are known as rhizomorpha, and in this particular species ramify beneath the bark of the pine tree, the mushroom-like fructification being perhaps several feet distant from the tree. Another dense mycelial structure, known as mycorrhiza, occurs in the truffle *Elaphomyces*, and other fungi, round the roots of various trees, including conifers and cupuliferæ. This mycorrhiza prevents the formation by the tree of its normal root-hair, and is believed by Frank to be in a condition of symbiosis with the tree, performing for it the function of absorption otherwise carried on by root-hairs. In the cultivation of the mushroom the mycelium is popularly termed "spawn."

Mycensæ, a very ancient city of Greece, fabled to have been founded by Perseus on a crag to the N.E. of Argolis, in the Peloponnesus. In the Homeric period, it was the capital of Greece and the home of Agamemnon. The existing remains, fully explored by Schliemann and Tsountas, reveal interesting traces of Cyclopean and Achaian architecture, such as the Gate of Lions and the Treasury of Atreus. Vases, weapons, personal ornaments of

gold, death-masks, and other relics of primitive civilisation have been found by the excavators, most of them showing a closer affinity to Oriental than to Greek art. The city was destroyed by the Argives as early as 468 B.C., and has never since been inhabited.

Myddleton. SIR HUGH, engineer of the New River, was born at Galch Hill, Denbighshire, Wales, in 1559 or 1560. He was sent to London to learn the goldsmiths' trade, and carried on business successfully in Basinghall Street throughout his life; he was also prosperous in the new trade of cloth-making. In 1603 he became M.P. for Denbigh, which he represented for many years. In 1605 and 1606 Acts of Parliament had been passed authorising the bringing of water from Chadwell and Anwell, in Hertfordshire, in order to improve the water supply of London; but no attempt was made to give effect to them. Myddleton offered to carry out the work, and began operations on April 21st, 1609. In spite of enormous difficulties, the artificial channel, which followed a winding course of 38 miles, was completed in 1613. In 1620 he began the work of reclaiming land from the sea at Brading Harbour, in the Isle of Wight. He was created a baronet on October 19th, 1622, and died in London on December 10th, 1631.

Myelitis, inflammation of the spinal marrow (Greek *myelos*, "marrow"), is a disease which sometimes results from exposure to cold, and may supervene upon caries of the vertebrae, the spinal cord from its position in the spinal canal being particularly liable to involvement in cases of vertebral disease. The symptoms vary according to the part of the spinal cord affected. Both sensation and power of movement are usually implicated, and these symptoms are generally especially manifested in the lower limbs, producing paraplegia, though the arms also may be attacked; when one side of the spinal cord is especially involved, the symptoms are particularly developed on one side of the body. Pain is not usually a marked symptom; there is rather loss of sensibility as a rule; there may be, however, a feeling of constriction, as of a band drawn tightly round the body, in the situation corresponding to the superior limit of the portion of spinal cord which is affected. Bed-sores are apt to develop, and trouble in connection with the bladder not infrequently arises. Acute myelitis is a serious disease, which frequently terminates fatally. In the milder form of the malady, recovery may occur, but some degree of paralysis is usually left behind.

Mygale, the largest of all the true spiders. It is met with in tropical South America, especially Brazil, Surinam, and Cayenne, and is peculiar in possessing four breathing organs instead of the now usual two. It is two inches long, and when standing with outspread legs, covers a space nearly one foot square. It occupies the clefts of trees and crevices of rocks and stones. Nocturnal in habits, it preys upon insects, and even on birds, from which circumstance it is known as the Bird-Catching Spider (*M. avicularia*). Henry Walter Bates, the naturalist of the Amazons, once found two birds

in a web stretched across a hole in a tree, one already dead, and the other—on which the spider was lying—dying shortly afterwards. He also saw little Indian children leading about one of these giants as a plaything, with a string round its middle.

Mylodon, a gigantic fossil sloth, the remains of which have been found in the Pleistocene of North and South America. Along with other huge creatures of kindred edentates of past ages, they have been grouped as the Gravigrada, or Heavy-footed Sloths. A skeleton found at Buenos Ayres, measured 11 feet from the front of the skull to the root of the tail. Such animals, obviously, could not have the tree-climbing habits of their present-day representatives, but it may be supposed that they uprooted trees and so obtained nourishment from their abundant foliage.

Myna, a bird of the Indian genus *Acridotheres* of the Starling family. The bill is short, strong, and slightly rounded at the ridge; the powerful feet have strong toes; the tail is round, and the head more or less crested. *A. tristis*, the Common Myna, is about 10 inches long with black and brown



THE COMMON MYNA.

plumage, with some white on the wings, tail, and under-surface. These birds feed on insects, fruit, and grain, and prefer the neighbourhood of towns and villages to wooded places. They are frequently kept as pets, and are said to excel parrots in imitating the human voice. The same has been said of birds of the allied genus *Gracula* (Linn.), in which the head bears yellow wattles behind the ears. They also are called Mynas. *Gracula religiosa* is fairly common as a cage-bird in Great Britain.

Myngs, SIR CHRISTOPHER, vice-admiral, was born in Salthouse village, Norfolk, England, in 1625. Bred a sailor he entered the navy, and in 1653 was captain of the *Elizabeth*, which, after a sharp action, brought a fleet of Dutch merchantmen, convoyed by two men-of-war, into the Downs, an affair that gave him great credit. In 1655 he was appointed to the *Marston Moor*, and served for several years in the West Indies. He was promoted vice-admiral in 1664, and next year took part in the battle of Lowestoft, his conduct in which gained him a knighthood. During the first three days of the prolonged battle off the North Foreland

in 1665 Myngs was absent. On the fourth day (June 4th), however, he led the van, engaging De Liefde, the Dutch vice-admiral, whose vessel was dismantled. The fight continuing to be stubbornly contested, Sir Christopher was fatally wounded, and died in London on the 10th of June. His son, CHRISTOPHER MYNGS, commanded the *Namur* in the battle of Malaga (1704), was Commissioner of the Navy at Portsmouth (1708), and died in 1725.

Myopia. [EYE. (Errors of Refraction.)]

Myosin, a proteid substance which occurs in muscle, from which it may be extracted by water and afterwards precipitated by salt. In most of its chemical characters it closely resembles ordinary blood fibrin. It appears to exist in muscle in a dissolved state, and probably to its coagulation is partly due the phenomenon of *rigor mortis* or death stiffening.

Myriapoda, a class of animals belonging to the phylum Arthropoda. The members of this group each consist of a head followed by a considerable number of somites, or segments, which are all similar to one another. Each of these has one or two pairs of jointed legs, the former being the case in the Centipedes, and the latter in the Millipedes. The head is armed with three pairs of appendages: the antennæ or feelers, and two pairs of jaws, known as mandibles and maxillæ. The myriapods all live on land and breathe by air-tubes or "tracheæ" running throughout the body. The Millipedes are vegetarian and harmless and the Centipedes carnivorous and venomous. The class is divided into two orders, the Diplopoda or Chilognathia, including the Millipedes, and the Chilopoda or Centipedes. The remarkable genus *Peripatus* was once included here, but is now relegated to a separate class, the Protracheata.

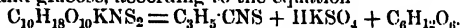
Myrmeleontidæ, a family of insects belonging to the class Neuroptera and including the "Antlions."

Myrmidons, a people inhabiting the south of Thessaly, who accompanied Achilles to the Trojan war. Their name has been variously explained. According to one conjecture, Jupiter peopled Thessaly by transforming ants into men (Greek, *myrmex*, "an ant"). Another account has it that they were so named by Actor, their king, who thus honoured his father, Myrmido, one of Jupiter's numerous sons. Strabo, founding on the evident resemblance of the words, favours the ant theory, but contends that it was bestowed upon them to mark their industry. Nowadays the word is most commonly applied to policemen and other limbs of the law because of their zeal and ubiquity.

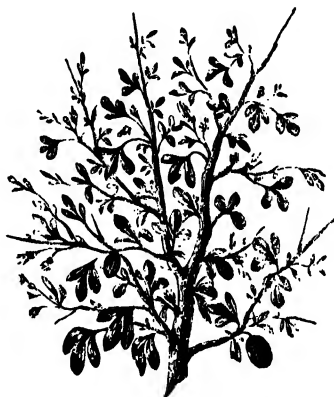
Myrobalans, the astringent drupaceous (drupe=stone fruit) fruits of various species of *Terminalia* and *Emblica*, imported from India for tanning and calico-printing. *Terminalia* is a genus of trees belonging to the calycifloral order Combretaceæ, the chief species employed being *T. Chebula*, the Chebulic, *T. citrina*, the Citrine, and *T. Bellerica*, the Bedda nut, Belleric or bastard myrobalans. The immature or unripe fruits are known

as black myrobalans. *Emblica officinalis*, the source of Emblic myrobalans, is an entirely distinct plant, being a large tree, the only species of a genus of Euphorbiaceæ. In India its bark is also used in tanning. Myrobalans yield permanent black and yellow dyes, valuable to the calico-printer.

Myronic Acid, is a member of the group of compounds known as glucosides, and exists, combined with potash, in the seeds of black mustard. It forms silky needles which, by boiling with baryta, or under the influence of a special ferment (myrosin) also present in the seeds, decompose into mustard oil, acid potassium sulphate, and glucose, according to the equation



Myrrh, a fragrant gum-resin, the produce of several species of *Balsamodendron*, a genus of the order Terebinthaceæ, natives of Somaliland and south-west Arabia. The chief species seem to be *B. Myrrha*, *B. Opobalsamum* and *B. Kufal*, small spinous shrubs. Myrrh is collected in Somaliland.



MYRRH.

and round Harrar, brought to Berbera, and shipped thence to Aden and Bombay; but the Somalis also cross over and collect myrrh on the hills east of Aden. It exudes from the cracks in the trunk near the root. All myrrh now comes from Aden or Bombay, the names Turkey or African, Arabian, Siam, or Persian, only indicating quality. Myrrh occurs in irregular sub-translucent, reddish-yellow or reddish-brown tears, aromatic and bitter. It contains a gum soluble in water, a resin sometimes amounting to 27 per cent., and a heavy volatile oil, sometimes 3 per cent. It was used by the ancients as incense, as an unguent and a perfume and in embalming. The offering of myrrh, with gold and frankincense, by the British Sovereign in the Chapel Royal on the Feast of the Epiphany, in commemoration of that of the Magi to Our Lord, dates at least from the time of Edward I. In medicine myrrh is chiefly used with aloes and iron. It seems to act specially on the mucous membrane, increasing appetite and facilitating digestion.

Myrtle (*Myrtus communis*), a native of western Asia, naturalised in the Mediterranean region. It is the only representative in Europe of the considerable and widespread genus which gives its name to the large calycifloral order Myrtaceae, an order which includes the gum-trees (*Eucalyptus*), the Clove (*Eugenia*), and the Brazil-nut (*Bertholletia*). The myrtle is a low-growing shrub, with evergreen, opposite, simple, dark-green leaves, studded with translucent glands containing a fragrant essential oil, and having well-marked infra-marginal veins. The white, sweet-scented flowers are on short axillary stalks, have an inferior ovary, five sepals, five petals, indefinite stamens, and a long slender style. The fruit is a purplish berry. The myrtle is fairly hardy in the south of England. By the ancients it was held sacred to Venus, and myrtle wreaths were worn by the victors in the Olympian games and by the Athenian magistracy. A fragrant astringent extract, known as *Eau d'ange*, is distilled from the flowers and the leaves are used in sachet-powders and other perfumery.

Mysia, in ancient geography, the name given to a territory in the north-west of Asia Minor, bounded on the N. by the Propontis (Sea of Marmora), on the E. by Bithynia, on the S. by Phrygia and Lydia, and on the W. by the Aegean. The Troad—the narrow strip bordering the Hellespont (Dardanelles)—was sometimes excluded from its limits. The chief mountains were Olympus (6,000 feet) in the north and Temnus in the south, and the principal rivers the Rhyndacus and Caicus (Bakir-Tchai). The leading towns were Pergannum (Bergama), Cyzicus and Adramyttium (Adramyti). The country is believed to have been colonised from Greece, but the point is not free from obscurity. The Mysians were allies of the Trojans. They were subdued by Croesus (about 550 B.C.) and successively passed under the rule of the Persians, Alexander the Great (334 B.C.) and the Syrians. On the defeat of Antiochus the Great (190 B.C.) they were handed over to a local dynasty, on the extinction of which they were merged in the Roman province of Asia and gradually vanished from the stage of history.

Mysore, or MAISUR (*Mahesh Asura*—"Buffalo demon"), a native state in southern India, entirely surrounded by British territory. It extends over 24,723 square miles, occupying a lofty plateau 2,000 feet above the sea level, with a slope towards the Bay of Bengal, into which the Cauvery, Tungabhadra, Krishna, the Northern and Southern Penner, Hagari, and Palar rivers discharge themselves. The area is divisible into two distinct parts, the hill-country, or Malnad, marked by isolated rocks (*drug*) that attain a height of over 4,000 feet, such as Nandidrug, Savandrug, on which strong fortresses were often built, and the plain, or Maidan, an undulating expanse thickly populated and well cultivated. The climate, owing to the elevation, is mild and healthy, and the soil yields all the products of India with many of the temperate zone, such as apples, peaches, and strawberries. Drought is the one serious drawback, and to guard against it 20,000 tanks or lakes have been made in various

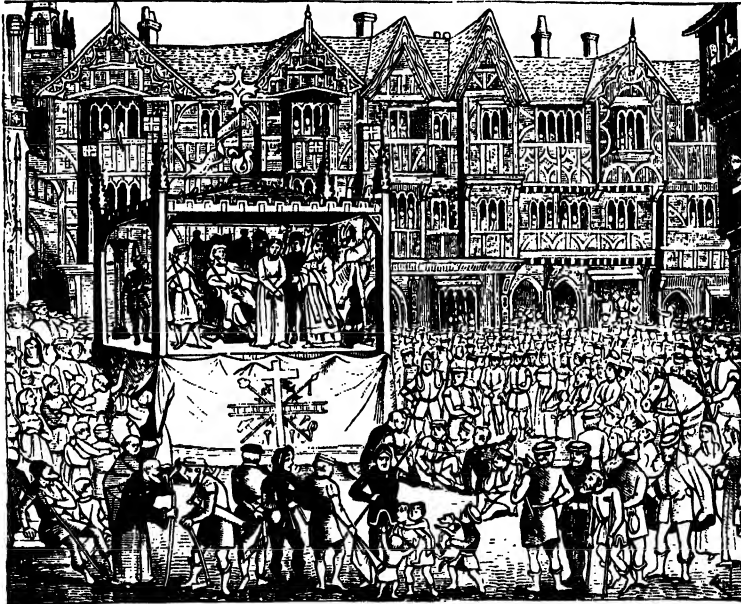
parts, yet in spite of this famine not seldom prevails, the visitation of 1876-8 being quite appalling in its severity. Gold-mining has been revived, but the manufacture of rugs and carpets, the smelting of iron, and the production of jewellery, are the chief industries. Pop. (1901), 5,538,482. **Mysore**, the ancient capital, stands in a valley at the foot of the Chamundi Hill ten miles S. by W. of Seringapatam. It consists of fairly well-built and spacious streets, covering some three square miles, and at the south is erected the vast quadrangular fortress, enclosing the palace of the Maharajah, who, however, resides chiefly at Bangalore, the administrative centre of the state. In the eastern suburbs are the British residency and the European quarter. Carpet-weaving is the chief industry. Pop. (1901), 68,111.

Mystagogue, literally, one who initiates into or interprets mysteries. In ancient Greece the word described the priest who prepared candidates for initiation into the several mysteries of the religion, especially those observed at Eleusis. The word was also applied, in the early Christian church, to the clergy who prepared for baptism, confirmation, and the eucharist, which were regarded as the sacred mysteries of the Christian Church. More loosely, the term has been used of the official who keeps the church relics and exhibits them to visitors.

Mysteries, in the religion of ancient Greece, were ceremonies of an exceptionally sacred character, participation in which was preceded by a course of special preparation called initiation. The initiated were not permitted to divulge what they saw and heard, so that any information concerning the mysteries is, for the most part, derived from Christian writers. It is probable that—at least in their full development and highest form—they represent a struggle after a deeper and more satisfying form of belief than any afforded by the popular religion of Greece. The *mystes* looked forward to a future life because he believed that the divine knowledge communicated at Eleusis had placed him outside and above the conditions of material existence. And this higher knowledge was not the privilege of a few favoured individuals; the mysteries were open to all who would submit to the severe and tedious process of initiation. The most celebrated mysteries were the Eleusinian, in which the worship of Demeter and Persephone became associated with that of Dionysus. The stories of Demeter and Persephone were originally nature-myths, explaining the vicissitudes of the seasons; but in the Eleusinian worship the primary meaning appears to have been lost sight of, and perhaps the secret lore and ineffable rites alluded to in the Hymn to Demeter, the *hieros logos* of Eleusis, embodied some new interpretation of the divine tale. The Eleusinian mysteries were celebrated on 22nd and 23rd Boëdromion (September). They included the dramatic representation of incidents in the lives of the deities worshipped, the exhibition of relics connected with their history, the delivery of oracular utterances and the chanting of traditional songs. During the solemn procession

from Athens which preceded these ceremonies the enthusiasm of the worshippers was raised to the highest pitch by means of constant worship at shrines along the way; and the awe-inspiring character of the subsequent ritual resulted in a state of tension and excitement very foreign to the ordinary character of Greek worship. The Orphic mysteries, though closely allied to the Eleusinian, soon passed into the hands of an inferior class of mendicant priests, and are condemned by Plato as demoralising. During the decay of Greek civilisation the Neo-Platonists exercised their ingenuity in inventing recondite meanings for the symbolic observances. In the last stage of their existence even the better class of mysteries had degenerated into licentious orgies.

constitute a complete cycle of Bible history. In 1264—a date probably earlier than the composition of any of these plays—Pope Urban IV. endeavoured to restore the sacred character of the mysteries by making them an integral part of the Corpus Christi festival, which was then instituted. It remains to mention a form of dramatic entertainment which may have had some share in shaping the destinies of the miracle. This was the literary monastic drama, which grew up in imitation of the “comedies” of Hroswitha (circa 920-68), a nun of Gandersheim, in Brunswick. Plays of this class were sometimes acted by the children of a convent or monastery school; such, for example, was the play of St. Catherine performed at Dunstable in 1110. Amongst the



A MIRACLE PLAY AT COVENTRY.

(From a Drawing by David Gee, for Sharpe's "Coventry Mysteries.")

Mysteries, or MIRACLE-PLAYS, mediæval religious dramas. (They are not to be confused with the word as used in the preceding article.) Strictly, the word should be spelt *mystery*, as it is derived from the Latin *ministerium*, a craft, or occupation, and was applied to those plays which were performed by the guilds. They were acted by lay associations, especially the craft guilds in their halls. We possess three collections of English plays of this type: the Townley plays, believed to have been acted at the fairs of Woodkirk, near Wakefield, in the 13th or 14th century; the Chester plays, dating from about 1400, and Coventry plays, which, for the most part, belong to the 15th and 16th centuries. All these are what are called “collective mysteries”—i.e. each consists of a group of plays, which, taken together,

various countries of Europe, in each of which the growth of the drama took a somewhat different course, France requires special mention, on account of the secular characteristics which were maintained through the influence of the *jongleurs* and *menestrels*, who corresponded to the Roman *mimi*. In France, theatrical performances were mostly in the hands of three great lay fraternities; the Bazoche (founded 1303), the Confrérie de la Passion, and the Enfants sans Souci, whose *sotties* and *farces* were in many respects an anticipation of the regular drama. Such plays as *Griseldis* (1395) and *Maistre Pierre Patelin* (1480) supply important landmarks in the development of dramatic art. Throughout western Europe the modern drama was developed from the miracle-play through the morality-play, in which allegorical personages

representing certain virtues and vices took the place of the characters from Scripture or sacred history; their popularity was ensured by the ludicrous behaviour of such characters as the Devil and his attendant, Vice. Afterwards historical, and then purely fictitious, characters were introduced side by side with the symbolical figures. John Heywood (d. circa 1580) was the first dramatist in England who set the latter entirely aside; but though the advance through the preliminary stages was so much more rapid in France, it was in England alone that the romantic drama was destined to reach its full development.

Mysticism, a form of religious life which consists in an effort to rise above the sphere of finitude, imperfection, and error, and enter into direct communion with the Divine Being. It is often confused with doctrines and tendencies which are utterly foreign and even hostile to its ultimate purpose, such as theosophy and symbolism; the reason is that these things, although not of the essence of mysticism, frequently are conjoined with it. Mysticism is a most important and stable element in most Eastern religions; amongst the various Oriental types Sufism is perhaps the most remarkable and the most interesting. In the West, mysticism has had to contend with the practical bent inherited from Roman civilisation, which received a fresh impetus from the immigration of the northern races; and here it has had a more varied history, blossoming with renewed vigour, often as a reaction against scepticism or rationalising, under a peaceful ecclesiastical organisation, or in times of political upheaval when the individual was forced back upon himself, and withering in the uncongenial atmosphere of social activity and material progress. To Neo-Platonism, itself strongly impregnated with Oriental modes of thought, is due directly or through circuitous channels the mysticism both of Catholic and Protestant Europe. The works of Dionysius the Areopagite are the link connecting the Neo-Platonists with the mediæval mystics. Mediæval mysticism, as handled by such men as St. Bernard of Clairvaux, Hugo of St. Victor, Bonaventura, and Thomas à Kempis, may be regarded as the complement of scholasticism, supplying the devotional element, with its corresponding theory, whilst the schoolmen worked out a system of rational theology on the basis of Church dogma. On the other hand, the German mysticism of the 14th and 15th centuries was a distinct effort to break away from ecclesiastical tradition; the aim of Meister Eckhart (1260—1329) and his followers was not so much to accommodate mysticism to Church doctrine as to reconcile this with their own Pantheistic views. To the school of Eckhart belonged Suso (1295—1366), Tauler (1300—61), in whom mysticism took a curiously practical bent, Ruysbroeck (1293—1381), and the anonymous author of the *Deutsche Theologie*, which exercised a powerful influence over the mind of Luther. Since the Reformation, mysticism has appeared amongst men professing every shade of religious belief, in a variety of forms which it is impossible to reduce to any common principle. That which has arisen

within the Roman Church—represented by St. Theresa (1515—82), St. John of the Cross, and the Spanish and French Quietists—has been marked by a complete absence of speculative tendencies, combined with a genuine spirit of devotion and a somewhat over-imaginative fervour. The mystical theories of Jacob Boehme (1575—1624), the extraordinary shoemaker of Görlitz, have influenced thinkers of the highest capacity, such as Schelling, Hegel, and Coleridge. The so-called Cambridge Platonists are reckoned among the mystics, and William Law (1686—1761) was a disciple of Boehme; but in England mysticism has seldom found a congenial soil.

Mytens, DANIEL, portrait painter, was born at The Hague, Holland, about 1590 and probably was educated in the School of Michiel Van Miereveldt at Delft. In 1618 he came to England, where he received the patronage of James I., and was made King's Painter on the accession of Charles I. On the arrival of Van Dyck, Mytens begged leave to return to Holland, where he died in 1642. His portraits include James, Marquis of Hamilton, 1622, (Hampton Court and Knoles); Lionel Cranfield, Earl of Middlesex, 1623 (Knoles); Lodovick Stuart, Duke of Richmond, 1623 (Hampton Court); the Countess of Newcastle, 1624 (Duke of Portland); Charles I., 1627 (Turin Gallery); Charles I., 1629, and Henrietta Maria, 1680; Charles I., Henrietta Maria and the dwarf Sir Jeffrey Hudson, with horses, dogs, and servants (versions at Windsor Castle, Serlby, and Knowsley).

Mythology, the science which deals with myths. Tylor defines myth as "sham history, the fictitious narrative of events that never happened." His books (*Primitive Culture* and *Early History of Mankind*) are invaluable to the student, for they contain myths from all parts of the globe, with exact references to the authorities whence they are taken, and where further information may be found. When the term "mythology" first came into use, it was applied to the stories told about the gods of ancient Greece and Rome, then extended to those of all Aryan peoples, and is now employed for myths in general; for it has been found that nearly all the classic myths have their counterparts among races of low culture at the present day. Andrew Lang, one of the greatest authorities on the subject, arranges myths under the following heads:—(1) *Divine Myths*, dealing with the origin of the gods and heroes. (2) *Cosmogonic Myths* dealing with the origin of the universe and of this earth in particular. (3) *Myths of the Origin of Man*. Some of these are based on the idea of creation; others on that of evolution. (4) *Myths of the Arts*, such as the invention of letters by Cadmus. (5) *Myths of the Stars*, which are commemorated in the names of the constellations. (6) *Myths of the Sun and Moon*, with their relationship to each other. (7) *Myths of the Origin of Fire*. With the subject-matter thus arranged, one may go on to acquaintance with the myths themselves. Those of the Aryan nations may well be taken first, special attention being paid to those of Greece and Rome, for which the best authorities will be the classic poets. In studying

myths of other peoples their sacred writings (if any such exist) should be examined and compared with other scriptures. The problem of mythology is to account for the extraordinary stories told about the gods and the search for the solution is full of interest. The idea of revelation is precluded by the nature of some of these stories, which could not possibly have originated with the Greeks of historic times, for at a very early date some explanation of them was felt to be necessary, though no satisfactory one could be found. But if one imagines primitive man occupied with the questions of the origin and destiny of the race, and considers his tendency to attribute powers similar to his own to brute beasts, and life and intelligence to the powers of Nature, there will be no surprise at gods having the shape of men and beasts and the morals of the lowest savages. Thus the morality of a myth may be taken as some criterion of its age. One may be pretty sure, apart from any evidence, that the stories of the intrigues of Zeus with women are older than the charming myth of Baucis and Philemon. This method of studying mythology will probably lead to the conclusion that, though religions be many, Religion is one, and may show its development where some people would least expect to find it (*cf.* Genesis xxii. 1, 2 with Isaiah i. 10-20).

Myxedema, a disease the characteristic symptom of which is the development of a peculiar oedematous thickening of the subcutaneous tissue, which is said to be the deposit of a mucous substance in the connective tissue lying beneath the skin. The oedema is most marked, as a rule, in the face and hands, the lips are thick, the eyelids are swollen, the expression of the features is materially altered, and the skin is dry and has a waxy appearance. The fingers become thickened and the hands assume what is known as the "spade-like" appearance. Certain symptoms are usually associated with the development of the subcutaneous thickening, the chief of which are slowness of speech, feeble gait, and deafness. The malady is said to be due to a loss of the normal activity of the thyroid gland, and in many cases it is certain that this gland undergoes atrophy. The method of treatment, which consists in administering the extract of the thyroid of the sheep either subcutaneously or by the mouth has been attended with very beneficial results.

Myxomycetes, an obscure group of organisms referred by De Bary, to whom we owe most of our knowledge concerning them, to the animal kingdom, under the name Mycetozoa, he considering their nearest relationship to be with Amœba. Other botanists, however, emphasise their resemblances to Fungi. Their vegetative body, unlike any fungoid thallus, is a naked irregular mass of protoplasm known as a plasmodium, which is formed by the coalescence of ciliated zoospores. These zoospores, like the plasmodium, are irregular in form, and possess the power of putting out finger-like processes or pseudopodia, moving by a crawling or "amœboid" movement. The plasmodium nourishes itself saprophytically, these

organisms living always in damp situations, such as tan-pits or decaying autumn leaves; and it may attain, as in *Fuligo varians*, the "flowers of tan," a length and breadth of several inches. It is granular, with many nuclei and foreign bodies, but has a clearer margin and sometimes apparently a non-protoplasmic envelope. The reproductive structures, or spores, are generally formed in sporangia, which arise as swellings on the plasmodium, drawing up its protoplasm into their interior. When mature this interior is either filled with spores, or contains also a network of filaments (*capillitium*), which is seemingly connected with the bursting of the sporangium. The spores resemble those of fungi, having a wall and nuclei and retaining their germinating power for years. Germination consists in the bursting of the spore and the escape of a naked, and at first unciliated, zoospore, which, as we have seen, coalesces with others to form a plasmodium. This coalescence has been termed multiple conjugation and considered as a sexual act. In addition to the "flowers of tan," one of the best-known Myxomycetes is *Plasmodiophora brassicae*, the "finger-and-toe disease" of the turnip and other Cruciferae.

Mzensk, a town in the government of Orel, Russia, 30 miles N.E. of Orel. It is an important market for agricultural produce, and has manufactures of lace, soap, candles, tallow, and leather. From 1147 to the beginning of the 14th century, it belonged to the principality of Tchernigoff, and from 1320 to 1509 to Lithuania, when it was absorbed by Russia. It was for long a frontier fortress against the Tatars. Pop., 16,000.

N

N, the fourteenth letter of the alphabet, corresponding to the Phœnician *nun* ("fish"), was derived from the hieroglyphic sign for water. It is the nasal dental, holding the same relation to *d* and *t*, that *m* does to *b* and *p*. Hence *d* was often generated after *n*, as in *thunder* (Anglo-Saxon *thunor*). The "parasitic" letter which thus arose through careless pronunciation belonged to the palatal class if a palatal letter followed, to the guttural if it came before a guttural (*e.g.* *sing-ging* for *sin-ging*). In some words the *n* itself is parasitic, *e.g.* *messenger* for *messenger*. *M* and *n* interchange before labials and dentals, *e.g.* *comfort* from Latin *confortare*; *count* from Latin *commite*.

Naas, a town of county Kildare, Ireland, 20 miles S.W. of Dublin. It was once the capital of Leinster and formerly had a castle and three monasteries. It is the site of fine military and also constabulary barracks, and has a brisk market. Pop., 3,836.

Nabataeans, a people of ancient Arabia, who occupied the country between the western confines of the Syrian Desert in the north of Arabia and the Gulf of Akabah on the Red Sea. They are conjectured to have been the Ishmaelite tribe of

Nebaioth (Genesis xxv. 13). They were a warlike, liberty-loving race of nomads, possibly Arabs, who, to their pastoral pursuits, added traffic in the myrrh and spices of Arabia Felix (Yemen) and bitumen from the Dead Sea, in constant demand in Egypt for the preparation of mummies. In 312 B.C. they successfully repulsed the assault of Antigonos the One-Eyed, Alexander the Great's general, on their stronghold of Petra. About 85 B.C. Aretas, their king, made himself master of Damascus and Coele-Syria and the Nabataeans also withstood the rulers of Judaea. In A.D. 105 the Emperor Trajan reduced Petra and the people recognised the supremacy of Rome. This acceptance proved fatal to them as a race, however, for they gradually lost their individuality and settled down as an orderly folk, addicted to trade and the cultivation of the soil. When the Arab invaders overran their country they were in the condition of fellaheen, and thereafter disappeared from history.

Nablus, a town of Palestine, finely situated on the pass between the mountains Gerizim and Ebal, 33 miles N. of Jerusalem. It is the capital of a district in the province of Beirut and the seat of a Greek



GATEWAY OF A MOSQUE AT NABLUS.

bishop. The leading industries are the making of soap and olive-oil. It is the ancient Shechem, which, once a Canaanitish settlement, was afterwards utterly raised by Abimelech, and then became a Hebrew holy place. In the valley of Nablus are the Oak of Moreh, or Tree of the Sanctuary, Jacob's Well, and Joseph's Grave. To this sanctuary

Rehoboam came to be crowned, and Jeroboam, having rebuilt the town, made it his residence for a time. The place ultimately became the religious centre of the Samaritans. In the first Christian century it was destroyed during the Jewish War, but a new town arose, a little to the west of Shechem, to which was given the name of Neapolis, where Justin Martyr was born (about A.D. 100), and of which Nablus (and also Nabulus) is a corruption. Pop., 25,000.

Nabob, in the period of the Mogul empire, was a deputy provincial governor, acting under a soubah, or viceroy. In the early days of British rule in India, the title was given in a spirit of ridicule to the officers of the East India Company and others who, after making large fortunes abroad, returned to lavish their money in England, especially in the purchase of pocket-boroughs. The word is a corruption of the Hindu *Nawwab*, "a deputy governor."

Nachtigal, GUSTAV, traveller, was born at Eichstedt, near Stendal, Germany, on February 23rd, 1834. Having studied medicine, he received an appointment as army surgeon. In 1863 he took advantage of a visit to North Africa in search of health, to observe the country and people, and in 1868 was chosen as the bearer of presents from the King of Prussia to the Sultan of Bornu. Starting from Tripoli in 1869 he went by way of Fezzan to Bornu, and after excursions into neighbouring states he returned by way of Darfur, Kordofan, and Cairo in 1874. He embodied the results of this expedition in *Sahara und Sudan* (3 vols.). In 1884 he was sent to arrange the annexation of the German possessions on the west coast of Africa, but died off Cape Palmas on April 20th, 1885.

Naden, CONSTANCE CAROLINE WOODHILL, poetess, was born at Edgbaston, Birmingham, England, on January 24th, 1858. Meeting with little success as a painter, she took up various branches of mental and physical science, for which she showed considerable aptitude, winning the Paxton prize for an essay on the geology of the Midlands (1885) and the Heslop gold medal for an essay on "Induction and Deduction" (1887). In 1881 she had published her first volume of poems, *Songs and Sonnets of Springtime*, and in 1887 appeared her second, *A Modern Apostle and Other Poems*. These, however, attracted small notice until, in an early number of *The Speaker*, Mr. Gladstone described their author as one of eight English poetesses who had displayed splendid powers. Unfortunately Miss Naden did not live to enjoy her reputation, for she died on December 23rd, 1889, and was buried in Birmingham. Her name was associated with the doctrine of Hylō-Idealism, which she adopted from its founder, Dr. R. Lewins, and which teaches that reality belongs to the immediate object of belief as such.

Nadir, the point in the heavens immediately beneath our feet; it is therefore the zenith of a place on the opposite side of the earth. Every locality has its own zenith and nadir, these two points forming a straight line with the centre of

the earth. Since this straight line is a vertical line for the place in question, and the horizon is a plane perpendicular to it, the zenith and nadir are respectively the upper and lower poles of the horizon.

Nadir Kuli, Shah of Persia, was born at Khorassan in 1688. He soon distinguished himself in the service of the governor of Khorassan. Having failed to upset the government of the province, he became a bandit chief and captured several fortresses. Struck by his talent for war, Shah Ashraf made overtures to him and appointed him to the command of the Persian army against the Afghans, whom he defeated in many engagements. In 1730 he was employed against the Turks, receiving high distinction for his services; but, disgusted at the peace made by Ashraf and ordered to disband his army, he led 7,000 men to Isphahan, deposed the Shah in favour of his young son Abbas and established himself as regent. He again attacked the Turks and regained some ceded provinces. At the death of Abbas, in 1736, Nadir became king and resolved to invade India. At the head of 120,000 men he advanced on Delhi, took it, and ordered a general massacre. After making peace with the Mogul he departed with an immense booty, including the famous Koh-i-noor diamond. He next attacked Bokhara, and finally obtained dominion from the Indus and Oxus to the Euphrates and the Caspian Sea. He was eventually assassinated on June 20th, 1747, and his nephew, Kuli Khan, was put upon the throne.

Nævius, CNEUS, an early Roman poet, flourished in the 3rd century B.C. He was born in Campania, and composed tragedies and comedies upon Greek models, as well as an epic upon the Punic War, and another after the pattern of the Cyprian Ilias. His satire upon the Roman aristocracy led to his banishment, and he died at Utica. Fragments only of his works are extant.

Nævus. This is a term applied to a pigmented patch of skin, or to an overgrowth of capillaries bound together by connective tissue (the ordinary capillary nævus), or, again, to the tumours containing inter-communicating spaces more allied to veins than to capillaries, the venous or cavernous nævus. Nævi usually exist from birth; they often remain practically stationary; they may undergo gradual enlargement or may waste away and disappear. Capillary nævi usually affect the skin of the head and face. Save for the disfigurement they cause, they are of little importance. In some instances it may be advisable to excise a small nævus, or to treat it by the application of caustics. The more common of these birth-marks are moles and what is popularly called "port-wine stain."

Naga. 1.—A large Tibeto-Burman people, who give their name to the Naga Hills in south and south-east Assam, Manipur, and Burma frontiers. They consist of over thirty distinct tribes, mostly speaking different languages and forming three main divisions, the western, central, and eastern

Nagas. Of all the Naga tribes by far the most considerable are the Angami of the central division, who occupy a large territory, eighty by fifty miles, between Assam and Manipur. The proper national name is *Naga*—i.e. "People"—and has nothing to do with the Sanskrit *Naga* ("snake"), nor are they serpent-worshippers.

2.—An ancient Indian people who traditionally ruled over a great part of the Indus Valley, with Patala and other cities as their capitals. They were of Sanskrit speech and apparently Aryans, with the Naga (snake) as their totem, and from the earliest times opposed to the Brahmins, by whom they were stigmatised as *Asuras*—i.e. Suras or Devas. With them originated the Buddhist and Jaina tenets, and Buddha himself was probably a Naga, whence the connection between the snake and these forms of religion. In the Puranas and other later writings the Nagas pass into the region of mythology and are no longer a historical people, but supernatural beings, or actual serpents. (Oldham.)

Naga Hills, a district forming the south-easterly corner of the province of Assam, British India. Its area occupies 6,000 square miles. The country is mostly forest, jungle, mountain, and river, and large tracts of it are very unhealthy. The chief rivers are the Dayang, Dhancswari, and Jamuna, and the Rengma and Barel ranges are the principal hills. Rice is the chief product. The Naga aborigines, one of the Indo-Chinese peoples, are stubborn jungle-fighters, who, in the latter half of the 19th century, constantly raided the British villages in the plains. In 1875 they massacred survey parties under Lieut. Holcombe, and Captain Butler, and in 1879 besieged the garrison of Kohima, the British headquarters. An expedition was then undertaken effectually to suppress these outrages, and by March, 1880, the Nagas, thoroughly cowed, submitted, though the Angami, the most powerful of the tribes, held out till 1886. Pop. (1901), 102,409.

Nagasaki, a seaport of Japan, situated on a peninsula and the extremity of a bay upon the west coast of the island of Kiushiu. The bay, which is surrounded by hills upon which part of the town is built, affords a good anchorage. It has a mild and healthy climate, though rain is prevalent in the summer months. Near the head of the harbour, and communicating by means of a bridge with the native town, is the small island of Deshima, on which stood the factory to which the Dutch (who practically monopolised the trade with the outside world) were restricted from 1637 to 1858. In 1859, however, Nagasaki became one of the five treaty-ports open to Great Britain and the United States, and was afterwards thrown open to other European nations. Its manufactures are silk, camphor, tobacco, porcelain, and lacquered-ware, and there is a large export trade. It is an important coal-station, for which its proximity to the great coal mines on the island of Takashima, eight miles distant, gives it special facilities. Pop. (1904), 153,300.

Nagor (*Corvicapra redunca*), a reed buck from western Africa, in which the horns have a strong forward curve.

Nagpur, a division of the Central Provinces of India, having an area of 24,127 square miles, and a pop. (1901) of 2,716,748. Aboriginal tribes are numerous in the district of Nagpur (area, 3,843 square miles; pop. 751,584.) It was governed by rajahs till 1853. The capital of the same name is 440 miles N.E. of Bombay and, together with its suburbs and surrounding cultivated lands, lies somewhat low. It is well furnished with trees, and has capacious tanks, gardens, and Hindoo temples of fine architectural character. On the Sitabaldi Hill, in the neighbourhood, is a fort with a small European garrison. Cotton and woollen cloths are manufactured, and there is a brisk trade in corn, cloth, salt, and European goods. Coal and iron are found. Nagpur town was the scene of a persistent assault by the Mahrattas (November 26th and 27th, 1817), who were completely defeated by the heroism of the garrison. In 1857 the promptitude of the authorities, and the staunchness of some of the native troops, frustrated the plans of the mutineers. Pop. (1901), 124,600.

Nahua, the primitive stock, whence are supposed to have sprung the historic and civilised peoples of the Mexican (Anahuac) plateau; *Toltecs*, pyramid-builders, 6th century; *Chichimecs*, 11th century, probably not originally Nahuas, but absorbed by them in 14th century; *Aztecs*, 15th century, founders of the last Nahua empire, with capital Mexico, overthrown by Cortes (1520-21). Branches of the Aztecs were the confederate *Acolhuas*, capital Tescuco, and *Tepanecs*, capital Tlacopan. These and all others speaking the pure Aztec (Mexican) language claimed to be true Nahuas. The group does not comprise the Miztecs, Zapotecs, and other civilised peoples of Mexico who were not of Aztec (properly Nahuatl) speech. The full form of the word is *Anah-uatl* ("Amid-the-waters"), in reference to the flooded depressions of the plateau round which were settled the original Nahua peoples.

Nahum, one of the twelve minor prophets of the Old Testament. He prophesied the destruction of Nineveh as a just punishment for persecuting the people of Israel, and endeavoured to raise the spirit of his nation. Some critics, however, place him after this destruction took place.

Naiad. [Nymph.]

Naiadidae, a family of small worms of the order Oligochaeta. It includes the common river red worm *Tubifex rivulorum*.

Nail, a horny growth consisting of modified epithelial cells. It rests upon a bed of skin, which is called the matrix of the nail, and the cells of this matrix are in a condition of active growth (reproduction and transformation), by which the body of the nail is continually renewed, the formation of fresh horny tissue taking place from

beneath and behind, so that the nail gradually grows forward and projects beyond the tips of the fingers and toes.

Nails. A nail is a small piece of metal (usually iron) consisting of a slender spike and a head, which is commonly round and flattened. Nails are driven into wood and various other substances in order to hold separate pieces together, but are also used for a wide variety of purposes. They are sometimes distinguished according to the character of their heads; thus the head of the *clasp* has pointed spurs, that of the *clout* is round and flat, and the *rose* has a conical head hammered into triangular facets. The smaller kinds of nail include the *tack*, a short sharp nail with a flat round head, used in upholstery and saddlery; the *brad*, used in nailing ceilings and floors, the head of which is merely a slight projection on one side; and the *sprig*, a sharp taper nail, with no head, used in shoe-making. Until the introduction of machinery the making of nails employed in the Black Country of England many thousands of hands, including even women and children.

Naini Tal, a hill station in Kumaon, North-Western Provinces, India, 70 miles N. of Bareilly. It is picturesquely situated on the banks of a lake among the spurs of the Himalaya, at a height of 6,400 feet above the sea. Used as the sanatorium of the provincial government during the hot weather, it is also a favourite summer resort of Anglo-Indians from the plains. After the Mutiny (1857) a military convalescent *dépôt* was established here, with accommodation for 350 European invalid soldiers. In 1880 a landslide, caused by a violent cyclone and rainstorm, involved the death of nearly 150 persons. The population, estimated at 7,000, is doubled during the season.

Nair, a Dravidian people of south-west India, formerly dominant in Malabar and Travancore, where they are still numerous and influential. Although classed as Sudras by the Brahmans, they claim to belong to the higher Kshatriya, or warrior, caste, with eleven minor divisions, numbering altogether nearly a million. The Nairs—i.e. "Masters"—are an extremely haughty people, great sticklers for their assumed social privileges, and holding in contempt all other classes except the Brahmans. They still retain the primitive matriarchal usages and traditions in full vigour, and till the middle of the 18th century Travancore was ruled by Nair princesses succeeding in the female line. In the family group also authority is exercised by the mother and eldest daughter, whom the maternal uncles and brothers obey implicitly, while the husbands are of no account, often dismissed altogether after the marriage, or else only tolerated as guests in the household. Land also is transmitted in the female line from mother to daughter, and cultivated by all the sons for the benefit of the community. Polyandry, formerly universal, appears to be disappearing, and unions may be described as "a contract based on mutual consent and dissoluble at pleasure." (Thevenot; Clements Markham.)

Nairne, CAROLINA OLIPHANT, BARONESS, poetess, was born on August 16th, 1766, at Gask, in Perthshire, Scotland. She belonged to a family of fervent Jacobites, being herself named after Prince Charlie. In 1806 she married Major William Murray Nairne, who became Baron upon the reversal of an attainder in 1824. She resided in Edinburgh, and afterwards, as a widow, lived on the Continent and in Ireland, finally returning to Gask, where, in the new house (the "auld" one having been demolished in 1801), she died on October 26th, 1845. Under the signature "B. B." (or "Mrs. Bogan of Bogan") she wrote many songs, among them being *Call'er Herrin'*, *The Land o' the Leal*, *The Laird o' Cockpen*, *Charlie is my Darling*, *The Hundred Pipers*, *Will ye no' come back again?* *The Rowan Tree*, *Gude Nicht*, *an' joy be wi' ye a'*, and *The Auld House*, which deservedly rank with the most beautiful of Scottish lyrics.

Nairnshire, a county in the N.E. of Scotland, having the Moray Firth on the N., Elgin on the E., and Inverness on the S. and W. It is 20 miles long by 15 broad, and contains 163 square miles, of which about one-quarter is under cultivation. The southern part, of granitic formation, is hilly (Carn Glas on the Inverness-shire frontier reaching a height of 2,162 feet), while the valleys are of Old Red Sandstone, and marl and freestone abound. The chief rivers are the Findhorn, renowned for its scenery, and the Nairn, flowing almost parallel from S.W. to N.E., and taking their rise in Inverness-shire. The soil on the coast is sandy and light, but inland is rich and fertile. The county unites with Elgin to return one member to Parliament. Cawdor Castle and Kilravock Castle, the home of the Roses, are the most notable seats, and Auldearn was the scene of the Marquis of Montrose's fourth victory over the Covenanters (May 9th, 1645). The industries include distilling, the quarrying of granite and sandstone, and fisheries, the salmon catch of the Nairn being considerable. Oats and barley are grown, and sheep, cattle, and horses raised. Pop. (1901), 9,291. NAIRN, the capital, is a seaport near the mouth of the Nairn, and on the Highland railway. There is harbourage for small vessels, and fishing is carried on, and the town has a rising reputation as a watering-place, and for its golf course. Col. J. A. Grant, the African traveller, was born at Nairn in 1827, and died there in 1892. Nairn is one of the Inverness burghs. Pop. (1901), 5,105.

Nakong (*Tragelaphus Speki*), Speke's Antelope, named in 1864 from the skin and horns of a male brought home by Captain Speke. These animals, which live in the country round Lake Ngami, have long, loose, mouse-coloured fur, and their hoofs are enormously developed, enabling them to travel well over swampy ground.

Nalu, a people of the low coastlands between the Cassini and the Rio Pongo rivers, Senegambia, whose "King," Yora Towell, accepted the French protectorate in 1865. They speak a dialect of the widespread Susu language (itself a branch of the

Mandingan), and all were forcibly converted into Mohammedanism by the Fulahs of the neighbouring Futa-jallon uplands early in the 19th century. Nevertheless they still preserve many pagan usages. Like their Landuman and Baga neighbours, the Nalus are of somewhat pronounced Negro type.

Namaqua, the chief branch of the Hottentot race who give their name to the extensive regions of Little Namaqualand, south of the Orange River, and Great Namaqualand, extending from the Orange northwards to Walfisch Bay.

Namaqualand, Great, or **NAMALAND**, a region of South-West Africa, extending northwards from the Orange to Damarraland, and inland as far as 20° E., where the boundary runs with British Bechuanaland. It is a sterile country, hilly in the interior, but with few streams. The only indentations on the coast are Angra Pequena, where the Germans settled in 1883, Sandwich Harbour and Walfisch Bay. With the exception of Walfisch Bay and a small district adjoining it, which are British, and in 1884 were handed over to Cape Colony, the region has formed part of German South-West Africa since 1885. **LITTLE NAMAQUALAND** is a barren division in the north-west of Cape Colony, bordering on the coast, immediately to the south of the Orange. The district is rich in copper, which has been known to exist there since the beginning of the 17th century, though it was not till 1852 that it was rendered marketable. The chief mining station is Ookiep, 90 miles from Port Nolloth, with which it is connected by rail. Pop. estimated at 17,000.

Namburi, a people of the Malabar coast, south-west India. They are of Dravidian stock and speech, but claim to be Brahmans, though abhorred by the orthodox Brahmans, who regard them as little better than outcasts, because of their matriarchal customs. Owing to the restrictions placed on marriage, they are decreasing; but they still possess great influence over the surrounding populations, on whom they have imposed their social observances sarcastically called the "sixty-four abuses." One of these, however, is a scrupulous adherence to the truth, so that all questions are answered with great deliberation to guard against the least inaccuracy even in the most trivial matters.

Names. (Anglo-Saxon *nama*; Latin, *nomen*; Sanskrit, *naman*, literally "that by which a thing is known.") Names must be as old as articulate speech. As soon as language was invented man must have begun to discriminate himself and his people from the neighbouring man and his people. These earliest names would be derived from those geographical or local features of his and their habitat which would strike his notice. Thus there would be "men of the hill," "men of the marsh," "river men," "sea men," "rock men," etc. As often as not, each race or tribe would call itself by the word in its language meaning "men." Dozens of native names in Africa, America and elsewhere simply mean "men." A great step in nomenclature

was the advance from geographical sources for naming to personal characteristics, physical or otherwise. Of these prehistoric names there are naturally no traces, as they were previous to all writing; but a study of the names in vogue to-day among savage peoples shows clearly enough how primitive man must have set about his task. Every nation, tribe, or clan has names even if it has not got a literature. No better example of the natural method could be found than that of the Indians of America. A young brave who was a swift runner was called "Flying-horse"; another who killed a bear in circumstances of personal bravery would be called "Great Bear"; another who hunted at night would gain the name of "North Star." These individual names (the equivalent of our Christian names) would lead to family names, these in turn splitting up into sub-family names and "totem" names (the group of families or clan taking as their totem the animal associated with the founder), at last forming the tribal name. Some such process must have been followed by every race in primitive times.

For the purposes of this article names may be classified as:—(1), Surnames; (2), Christian names; (3), names of animals; (4), place names; (5), national names; (6), names of things.

(1.) Surnames are best classified as (A), Patronymic, derived from early personal names; (B), Local, from places or occupations; (C), Sobriquets or nicknames, usually from physical peculiarities. (A). From patronymics have been derived the largest number of names in the world's languages. For frequency in our language we have no Christian names to compare with John, from which comes Jack; Thomas, from which comes Tom; Richard, from which comes Dick. These are all good examples of patronymic surnames. Nothing could be more natural than the adoption by the child, after it had reached manhood, of part of its parent's name. Thus John would give Johnson, that is, the "son of John"; Jones would arise in the same way, as also Jackson, etc. Richard, Dick, have given Richardson, Dickson, Dixon, Dickenson, and Dickens. Thomas gives Thompson, Thomasson, etc. Analogously, we used the Norman "Fitz" in composition, e.g. Fitz-William, Fitz-Payne, Fitz-Hardy, Fitz-Patrick, and Fitz-Neele or Neil. In Welsh the patronymic is "Ap" and thus we get Ap-Hugh becoming Pugh; Ap-Owen becoming Bowen; Ap-Howell becoming Powell; and Ap-Rice becoming Price, Preece or Reece. "On" and "en" in French, from the early Saxon "kin" forming the English "in," are other patronymic forms; e.g. Alice, Alison; Hugh, Huon, and Huguenot; Beatrice, Beton, and Betson; Biggs, Biggins; and Gibbs, Gibbons. The same processes have been at work in all languages. Thus Russian Ivan "John" becomes as a patronymic Ivanovitch, or Ivanovsky. "John's son." Dutch Jan becomes Jansen, and so on.

(B). Local or occupation names form almost as large a class, and many of them have existed long before patronymics. Take the enormous family of Smith which has existed since man passed from the Stone to the Iron Age, and since the first Smith

stood at his anvil to "smite" the molten metal. The compounds of Smith are numberless, e.g. Arrowsmith, Goldsmith, Goldsmid. All trades have thus furnished surnames. Frobisher means furbisher, a burnisher of metals; the French Forgeur is a forger of metals; Brassey is a brazier; Whittle a man who "whittles" or puts an edge on metals; Naylor, a nailmaker; Steele, and German Stahlmann, a steelworker; and Lockyer, a locksmith. Many surnames are simply a man's calling, e.g. Shepherd, Glover, Miller, Baxter or Baker, Webster or Weaver, Kemp from the German "Kampfen" (soldier); Crowther, a player on the "crowd," an ancient Welsh form of the violin; Fletcher from "fledger," a man who feathered arrows. From the names of places we get such names as Welman, Weller, Attwell, Atwater, Bywater, i.e. he who lives by the well or water; Leigh, Lee, Lea, he who owned "lea," good pasture land. The man living by the village Green would be first John of the Green and then Green, Greenslade, and Greening; if near the market cross, he would be Cross, Crossman, and Croucher. The man by the bridge would be Bridger, and the inhabitant of the small town would be Lyttleton. The names of some of the noble families are but allusions to a past lowliness. Thus Grosvenor means *Gros veneur*, French "Great hunter," the Duke of Westminster's ancestor being the king's chief huntsman; and the great family of Beauchamp owes its title to a founder who owned the "beau champs"—"fair field."

(C). Nicknames have been a rich source of surnames, e.g., Lightfoot, Longman, Prettyman, Sheepshanks, Cruikshanks, Whitehead. The man who was clever was called "Kenning," e.g. Canute, Canning, while the man who resembled animals was called Fox, Wolf, Bearman, Barwise, i.e. as wise as the bear. Some names are not so obvious, e.g. Ruggs, from the old-time vagabond; but there can be no question of the origin of the name Strong'th'arm, which is to be seen to-day over a London shop.

(2.) Christian Names. It is almost certain that most of the Christian names of to-day are the earliest names used by man. The Scripture names arose usually from the conditions under which the bearer was born or from personal traits. Adam means "red earth"; Cain, "begotten"; Noah, "comfort"; Adah (whence our name Ada), "ornament"; Nathaniel, Jonathan, "the gift of God"; Simeon, "snub-nosed"; Matthew, "gift of God"; Jacob, a "second child"; Benjamin, "son of sorrow"; Elisheba, "God hath sworn"; and Daniel, "judge."

GREEK NAMES. An ancient Greek had only one name given him, on the tenth day from birth when a family banquet was held. The Greeks were extremely particular about their family names and were very exclusive and cliquy. A name was regarded more as a bond to keep the family, clan, or city together, one person being nominally head. Most of their names were derived from mythology, the titles and attributes of their gods and goddesses being the foundation of much of their nomenclature. Hera, "the ox-eyed queen of heaven"; Athene, "goddess of wisdom"; Apollo, "the

destroyer"; Helios, "the sun," were all the fundamentals of many names; and Helene, "light," has existed into Christian times as Helena, Elaine, Eleanor, Leonora, Annora, Lena, and many others. Selene, the Greek name for the "moon," is the English Selina; the Greek who was called Isidoros was "the gift of Isis"; Heliodorus, the "gift of the sun"; while Theodorus and Dorothea both meant "gift of God."

ROMAN NAMES were recruited from various sources. They had, like ourselves, a family name in addition to a personal one, and a group of families was known by one clan or tribal name. Thus a Roman would possess (a) his personal or what we should call Christian name, (b) his family name, (c) his clan name, and (d) an extra surname (agnomen) bestowed for some great exploit, e.g. Publius Cornelius Scipio Africanus. Sometimes the last name arose out of some personal peculiarity, as, for instance, in the case of the great Cæsar, whose name is said to have been derived from the fact that his mother was delivered by an abdominal section (*Cædo, cæsum*, "cut"); hence the modern obstetric phrase, Cæsarian section. Marcus, a common Roman name, was from the Greek, meaning "soft and tender"; Lucius, "light," meaning born at daylight; Julius, from the Greek, meaning "beardless." Sometimes the Romans simply named their children in the order of their birth, e.g. Quintus, Sextus, and Septimus, Decimus, and so on.

To modern Christian names most languages have contributed. The Bible is, of course, a prolific source. In many instances one Scriptural name has branched out into many later-day names. Thus from Magdalene we get the variants Mandlin, Maud, and Madeline, while other countries can muster together almost forty names derived from the same source. From "Mary," again, England gets no less than ten names, France six, Spain five, Italy three, Bavaria eight, and Switzerland six. Elisabeth has given no less than fifty. Joachim has formed twenty, although not one in the English. Agnes is Latin *agnus*, "holy"; Margaret is Greek *margarite*, "pearl"; and Katharine, Kate, are Greek *katharos*, "pure." Emily, Lucy, Anthony, Cecil and Cecily have their counterparts in the Latin Æmilius, Lucius, Antonius, and Cæcilius.

(3.) Animal Names. It is no easy task to trace the origin of the names of animals. Several probably owe their titles to a mythological connection with or consecration to the old-world deities. Thus the bear was sacred to Thor, the wolf to Odin, the boar to Frey. But whether the deities took their names from the animals or the animals took theirs from the deities is not known. Another name for Thor was, in Old Norse, *Þjörri*, signifying someone "bold and wise," and this name it is suggested the bear took from the god, or the god took from the bear. Thus again the wolf was sacred to Odin, "god of the asses," from which in early Anglo-Saxon we get *Woden*, later "Wulf," and so "Wolf." The boar of Frey, "god of sun and rain," comes from the Anglo-Saxon "Beorn." Old Norse *Jöfurr*, while pig comes from Old Norse *galti*, "a boar-pig," whence Galt, still in use in Scotland and the

north of England. Horse comes from the Anglo-Saxon *hengst*, Old High German *hengist*, Saxon *hors*, the names of the leaders, as every schoolboy knows, of the first Saxon invasion of England. The name lion has defied philologists; but rhinoceros means "he of the horned nose," and hippopotamus is Greek, "river-horse." When we come to birds our task is easier, for they are so often onomatopœic. Thus cuckoo, pee-wit, chaff-chaff, chough, whip-poor-will, get their name from the cry they utter. Again, birds are called from their habitats, as canary (Canary Islands), guinea fowl (Guinea Coast, Africa), bantam (Bantam, Java), brahma (Brahmaputra, Asia), pheasant from the Phasis River in Asia Minor, and so on. The turkey was called so from a mistaken idea that it was a native of Turkey, whereas it is indigenous in the New World, but the name has stuck. Nightingale is Anglo-Saxon *nihtgale*, "songster of the night"; kingfisher is the "king of fishers"; flamingo is from its "flaming" colour (Latin *flamma*); ostrich is simply the Greek word for bird, while vulture is from the Latin *vellere*, *vultum*, to "pluck" or "tear," in allusion to the bird's voracity.

(4.) Place Names. The names of countries, towns, and villages arise in manifold ways, making classification difficult. England is the "land of the Angles"; Egypt is the Greek name which displaced the native name of Kem or Ham, "black," probably in allusion to the dark alluvial soil; Norfolk and Suffolk are the land of North-folk and South-folk respectively; Ely, "isle of the eels"; Harwich, Anglo-Saxon *æwer-wic*, "place on the Ore"; Ikley means "bad cliff." The suffixes ham, burgh, ton, thorpe, thwaite, enter into hosts of town names, e.g., Cottenham, Farnham, Southampton, Burnham Thorpe, Applethwaite, Edinburgh. Then places were named after explorers. Thus America gets its name from Amerigo Vespucci, a Florentine in the Spanish service, who went there after Columbus. Washington and Pennsylvania, Vancouver, and Hudson Bay all record the names of well-known historical personages. And, lastly, countries gain their names through queer mistakes or by corruptions. Of the first Yucatan is a good example. When Hernandor de Cordoba landed in 1517 the natives, in answer to his inquiry as to the name of their country, said "*Tectacan*," or "*Jucatan*," meaning "I do not understand," or "What do you say?"; and the Spaniards thinking this the name of the country, it has been called Yucatan ever since. Again, the Congo is called *Zaire* by the natives. When the Portuguese landed at the river mouth in 1484, they were told the country belonged to *Mwani Congo* ("lord of the mountains"), and, thinking Congo the name of the people, they christened the river so. Tierra del Fuego, "land of fires," was so called by Magellan because when he first sighted it at night he saw the campfires of the Yagans burning all along the beach. Of corruption, Ceylon is a good specimen. It is derived from the Sanskrit *Sinhala*, "home of the lions"; the Malays, mistaking the word, translated it into their language as *Pulo Selan*, "isle of gems." The Javanese copied the Malay and called it

Seilan, whence we get the Portuguese *Cilan* and the English Ceylon.

(5.) National Names are usually but little else than glorified nicknames, though some possess a dignity of their own. Thus the ancient inhabitants of Gaul were called the Franks (Latin *francus*, "free") because of their love of freedom. The great negro family gets its name from its colour (Latin *niger*, "black"); while the inhabitants of New Guinea are called Papuans, from the Malay word *papumah*, "frizzly-headed," in allusion to their mop-like hair. National nicknames, pure and simple, are interesting. England is called John Bull from the publicity given to the name by Dr. Arbuthnot's satire, published in 1742, on Dr. John Bull, who wrote "God Save the King"; America is "Uncle Sam," from a playful expansion of the initials "U.S.," United States. America's other name, "Brother Jonathan," came from Jonathan Turnbull, a friend of Washington, whom the latter always referred to as "Brother Jonathan," and whose advice was so much valued that he became synonymous with the new Republic's policy.

(6.) Names of Things. There is no end to the odd ways in which inanimate objects gain their names. Sometimes it is the inventor, sometimes the noise they make, e.g., bomb, pom-pom, &c. Many owe their names to their place of origin. Thus bayonets were first made at Bayonne; worsted was first spun at a village of that name in Norfolk; cambrics came from Cambray; damasks, damson, damascene come from Damascus; Arras tapestry from the town of that name; dimity from Damietta; currants from Corinth; indigo (indicum) from India; parchment from Pergamum; calico from Calicut; the magnet from Magnesia; muslin from Mosul, and so on. Some words are nothing but the running together of words signifying the actual nature of the things named. Thus curfew is nothing but French *couvre-feu*, "cover fire," the curfew bell ordering the peasant to cover his fire. Sarcophagus, again, is Greek, "flesh-eating," from the ancient belief that the limestone, of which the old coffins were made, consumed the flesh of the corpse laid in it.

Namollo, aborigines of north-east Siberia, occupying the district at the mouth of the Anadyr and along the west coast of Bering Strait. They show strong Eskimo affinities, but whether these are due to common descent or to intercourse and mixture is uncertain. By some observers they are allied to the Chukchis, forming the fishing section of that race; but the language is wholly distinct, though evidently affected by Eskimo influences.

Namur, a province of Belgium, having Liège on the N.E., Luxembourg on the E., Hainault on the W., and France on the S. and S.W. It is 57 miles long by 37 miles wide, and contains 1,413 square miles. The surface, with the valleys of the Meuse and Sambre, is well wooded; the minerals include coal and iron, and the soil yields corn, oil-seeds, fruit, and dye-plants. Some heights of the Ardennes form the hilly ground. The Meuse, with its tributary the Lesse, from the south, and

the Sambre from the west, unite at the town of Namur and flow eastwards. Most of the people are Walloons. Pop. (1901), 349,483. The capital, **NAMUR**, at the junction of the two rivers, is at the foot of a height upon which stands the citadel. The town is protected by five large and four small outlying forts. The different parts of the town are connected by bridges; but, owing to the fortunes of war, few old buildings have survived the numerous bombardments. The modern cathedral (1772) and the church of St. Loup (1653) are fine, and, besides the hôtel de ville, the belfry, and the arsenal, there are museums and an art gallery. The chief industry is the manufacture of cutlery, other occupations being leather-working, and iron and brass-founding. The citadel is supposed to have been the site of Cæsar's camp. Louis XIV. took Namur in 1692, but it was recaptured by the English, under William III., in 1695. Pop. (1900), 32,333.

Nana Sahib, or DUNDHU PANTH, one of the authors of the Indian Mutiny, was born about 1821 and adopted by the ex-Peishwa of the Mahrattas. He was a native of the Deccan, his father being a Brahmin. At the death of the Peishwa, in 1851, Nana expected the former's pension to be continued to himself. His expectations not being fulfilled, he intrigued against the British and, at the outbreak of the Mutiny, was proclaimed Peishwa, and made himself eternally infamous by the massacre of Cawnpore. After the quelling of the Mutiny he escaped to Nepal, where he is reported to have died.

Nancy, a town in the N.E. of France, capital of the department of Meurthe-et-Moselle, pleasantly situated in a fertile plain on the left bank of the Meurthe, 220 miles by rail E. of Paris, and 94 miles W. of Strasburg. It consists of the old and new town, and suburbs. The old town, which contains some fine public buildings, has narrow irregular streets, but, in the new, the streets are wide and regular. The Place Stanislas, from which a triumphal arch leads into the handsome Place Carrière, has a statue of Stanislaus of Poland, who lived here as Duke of Lorraine. The Cours Léopold and the Pépinière are finely planted. The modern cathedral, the churches of the Cordeliers (with tombs of the Dukes of Lorraine) and of Notre Dame de Bon Secours, the hôtel de ville, and the seven gates are worthy of note. The manufacture of broadcloth, cotton, yarn, hosiery, and lace, together with brewing, dyeing, tanning, and iron-working, are the chief industries. Formerly Nancy was the capital of the duchy of Lorraine, was the scene of the death of Charles the Bold (1477), and the birth- and death-place of Jacques Callot (1592-1635), the engraver. From 1870-3 it was in the hands of the Germans. Pop. (1901), 90,524.

Nankeen, a kind of cotton cloth made at Nanking in China, whence its name. Its peculiar yellow tint belongs to the cotton itself. In the earlier half of the 19th century clothing made of nankeen was much in vogue in England, and cloths bearing a strong resemblance to the genuine stuff

were manufactured in most European countries. The name is now used in a more extended sense.

Nanking, a Chinese town, capital of the province of Kiang-su, extending from the right bank of the Yang-tse-Kiang to a distance of three miles. The town, which is 560 miles S.E. of Peking, is 18 miles round, and is surrounded by a wall 40 feet high. The river, which is here $1\frac{1}{2}$ mile broad, is very deep and runs with a strong current. Between the walls and the river is marshy land crossed by causeways, a deep ditch leading from the river affording protection on the west. A party-wall separates the Manchu and Chinese quarters. The city, which is a great literary centre, is the residence of the governor-general of three provinces with his official staff. The streets are fair, but the houses insignificant, and the inhabitants are largely employed in the production of satin, crape, nankeen, paper, ink, and artificial flowers made from pith. Till the 13th century Nanking was the Chinese capital, and from 1853 till 1864 it was in the hands of the Taepings, who wrought much havoc upon it, destroying, among other things, the famous Porcelain Tower, which was a nine-storeyed structure of octagonal form, 261 feet high, built in the 15th century at a fabulous cost. In 1899 the port was thrown open to foreign trade by the Imperial Government. Pop. estimated at 150,000.

Nan-Man, *i.e.* "Southern Barbarians," a term applied in the early Chinese records to the aborigines about Lakes Tung-ting and Po-yang, whence they were driven to the Nan-ling Mountains.

Nansen, FRIDTJOF, Arctic explorer, was born near Christiania, Norway, on October 10th, 1861. He was educated at the University of Christiania, and made his first journey to the Arctic regions in



FRIDTJOF NANSEN.

(Photo: Langflet, Ltd., Old Bond Street, W.)

1882, being appointed curator of the Bergen Natural History Museum on his return. In 1888-9, he crossed Greenland (described in his book *Across Greenland*), and afterwards became curator of the

Museum of Comparative Anatomy in Christiania University. Then followed his famous voyage in the *Fram*, specially built to withstand the pressure of ice. Starting in 1893, in the autumn he made New Siberia Island, and drifted with the current westwards till March, 1895, when, with Johansen, he left the ship and travelled across the ice as far as $86^{\circ} 13' N.$, the highest point hitherto reached. Returning southwards he wintered in Franz Josef Land, and in June, 1896, met with the Jackson-Harmsworth Expedition which had been sent out to explore Franz Josef Land. Nansen returned with the party in the *Windward*, arriving in Norway in August, 1896, only a few days before the *Fram*. Of this memorable exploration he published a full account in *Farthest North*. After holding the chair of Zoology in Christiania University for several years, he was chosen, in 1906, first Minister at London after the creation of the Kingdom of Norway.

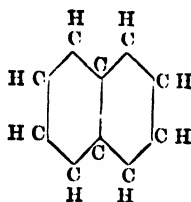
Nantes, a town of Western France, capital of the department of Loire-Inférieure, situated upon the right bank of the Loire near the infall of the Erdre and Sèvre, 215 miles S.W. of Paris. Part of the town is on two of the islands which here stud the Loire, and there are sixteen bridges. It is one of the finest towns in France, having good squares, and two miles of quays, while its position, 40 miles from the ocean, makes it convenient for commerce, large vessels, however, not ascending higher than St. Nazaire. Among the chief public buildings are the 15th-century cathedral, with sculptured entrances and fine monuments; the modern Gothic church of St. Nicholas, with a tower 275 feet high; the 14th-century castle, the palais de justice, the hôtel de ville, and a picture gallery. The chief manufactures are blankets, serge, flannel, prints, ships' boilers, etc., canvas, cordage, and chemicals, and there are cotton-mills, sugar, iron, glass, and bleaching-works, and a large trade is done in sardines and preserved meats. The foreign trade is considerable, though less important than it was owing to the increasing traffic at St. Nazaire. Partly to overcome the difficulties of navigation, and partly to arrest the decline of its commerce, a canal to the mouth of the river was constructed in 1893. The town is of historic interest. It passed with Anne of Brittany to the French Crown in 1491, and is famous for the Edict of Toleration issued in 1598 by Henri IV. and revoked by Louis XIV. in 1685, and for the Noyades, or Drownings, which took place during the Revolution (1793), under the orders of the infamous Carrier. Pop. (1901), 123,242.

Nantwich, a town in Cheshire, England, on the Weaver, 4 miles S.W. of Crewe. The principal buildings are the church of St. Mary and St. Nicholas, with an octagonal tower; the grammar school dating from 1611; the town hall in the Gothic style, and the modern market hall. Formerly the salt springs constituted the principal industry—hence the Welsh name *Halen Gwyn*, "the white salt town"—there being no fewer than 300 works in the time of Henry VIII.; but the discovery of mines in the valley of the Weaver, better situated for water carriage, led gradually to the decay of the

trade, although the brine baths still enjoy repute. The leading manufactures now consist of boots, shoes, and textiles. Pop. (1901), 7,722.

Naphtha, a term applied to a number of inflammable organic liquids occurring naturally, as in petroleum, or obtained by the distillation of organic products as wood naphtha, bone naphtha, etc. Two products are commonly known under the name, *i.e.* the petroleum and coal naphthas. The first of these consists of the lower boiling portions of the petroleum, with a specific gravity varying from about .65 to .75. By further separation it gives the liquids gasoline, benzine, benzoline. Coal naphtha is obtained by the distillation of the coal tar, and is that portion which boils below 200° C. and possesses a specific gravity of from .86 to .90. The yield of naphtha from coal-tar varies with the different kinds, reaching from 5 to 20 per cent. of the tar. Both consist of mixtures of different hydrocarbons, *i.e.* compounds of carbon and hydrogen. Naphtha finds many applications industrially, being used as a solvent for resins, oils, greases, indiarubber, guttapercha, wax, etc. It is also employed in perfumery, and largely as an illuminant, especially for the open flaring naphtha lamps of costermongers' barrows, street-repairers, &c.

Naphthalene is a hydrocarbon of the composition represented by $C_{10}H_8$. It is formed by heating many organic substances, and is on this account present in coal-tar, in which it was first discovered in 1819. From this source it may be obtained by allowing the portions of the tar which boil at from 180° to 200° C. to crystallise. After purification it is obtained as a white flaky solid, with a peculiar aromatic odour. It melts at 98°, and boils at 218° C., but sublimes readily at lower temperatures. It forms very many important compounds—the naphthalene derivatives, many of which are employed in the manufacture of various dyes. The study of these compounds indicates that the constitution of naphthalene is best represented by—



(*Cf.* BENZENE.)

It is employed in the alcoh-carbon gas-burners, and is also used as an insecticide and preservative.

Napier, a town on the southern side of Hawkes Bay, on the eastern side of North Island, New Zealand. It has an excellent harbour, sheltered by a breakwater, and is in communication by rail with Wellington, New Plymouth, and Auckland. There is an increasing export trade in wool, frozen and tinned meat, and timber. The town, which is the seat of a bishop, has a museum and several good public buildings, whilst its attractiveness is en-

hanced by a fine esplanade on the bay. Pop. (1901), 8,775.

Napier, SIR CHARLES, admiral, was born at Merchiston Hall, Stirlingshire, Scotland, on March 6th, 1786, and entered the navy in 1799. In 1807 he was made a commander, and as such witnessed the reduction of the islands of St. Thomas and St. Croix, assisted in the cutting out of a Spanish ship lying under batteries off Porto Rico, took Fort Edward, Martinique, and was posted in 1809. Being placed on half-pay, he went to Portugal and took part in some of the fighting, receiving a flesh wound at Busaco (1810). From 1811 to 1813 he was engaged in harrying the French coasting trade in the Mediterranean, and in 1814 was occupied in the operations against Baltimore, United States, and was made C.B. in 1815. The long peace not providing him with sufficient employment at home, he, in 1833, accepted an appointment as admiral of the fleet of Dom Pedro, regent for the young Queen of Portugal, and in that capacity gained a great victory over a squadron acting in the interest of Dom Miguel, *de facto* king, off Cape St. Vincent. When order was restored in Portugal Napier returned to England, and in 1839 was sent to the Mediterranean, where, under the direction of Sir Robert Stopford, he rendered good service during the operations of 1840 on the coast of Syria. For this he was made K.C.B. In 1841 he was elected M.P. for Marylebone, in 1846 became rear-admiral, and in 1853 vice-admiral. In 1854 he was, at the outbreak of the war with Russia, made commander-in-chief in the Baltic, but effected little, despite his bluff at a public dinner before he started that, within a month of making the Baltic, he would be "either in Cronstadt or heaven." He entered the House again as M.P. for Southwark (1855), was promoted to the rank of admiral in 1858, and died on November 6th, 1860.

Napier, SIR CHARLES JAMES, conqueror of Scinde, was born in London, on August 10th, 1782. He entered the army at an early age, and was *aide-de-camp* to Sir James Duff during the Irish Rebellion (1799). In 1806 he was captain in the 50th Foot, and as major was wounded and made prisoner at Corunna (1809). In 1810 he was wounded at Busaco, and sailed to England next year. He afterwards took part in the American War, and returned to Europe just too late to be present at Waterloo. In 1819 he proceeded to the Ionian Islands, and for several years was resident in Cephalonia, for which he laboured strenuously. He offered his services to the Greeks in the cause of their independence, but could not accept the conditions of the King. After his return to England (1830) he engaged in literary work and political controversy, and was promoted major-general in 1837. During the Chartist agitation he was placed in command of the northern district in England, but the crisis passed. In 1841 he accepted a command in the Bombay Presidency, and proceeded, in 1842, to Scinde, where he found the Ameers greatly excited in consequence of the British reverses in Afghanistan and disaffected to British

rule. Believing annexation of the country inevitable, Napier crossed the Indus, and soon afterwards initiated the masterly series of manœuvres, which culminated in the occupation and conquest of Scinde. The Baluchees were defeated, with terrible slaughter, at Meance (February 17th, 1843), and the lion of Mirpur was beaten at Dubba (March 24th), and again at Shahdadpur (June 14th). Napier, created G.C.B. (1843), now organised the administration of the country, but his work was interrupted in 1844 by a campaign against the northern hill tribes, who were not reduced till 1845. Meanwhile, Lord Ellenborough, Governor-General of India, had been recalled, much to Napier's pain, and after the first Sikh war was ended he resigned (1847) the government of Scinde and returned to England. He had been promoted lieutenant-general in 1846. In 1849 the second Sikh war broke out, and Napier was again sent out to India as commander-in-chief. On his arrival he found the campaign over, and a quarrel with Lord Dalhousie, the Governor-General, led him to throw up his appointment. Coming home, he settled at Oaklands, his place near Portsmouth, where he died on August 29th, 1853.

Napier, JOHN, the inventor of logarithms, was born in 1550, at Merchiston Castle, Edinburgh. He studied for a short time at St. Andrews (1563), and then went abroad, probably to Italy and France. In 1571 he returned home, settled on an estate near Loch Lomond, and interested himself in agriculture, then at a very low ebb. He invented machines by means of which water could be kept down in coal mines, and flooded mines cleared. Throughout his life he devoted himself to the study of mathematics, but in 1588 he interrupted his studies to take part in a controversy with Roman Catholic apologists, and wrote a book *A Plaine Discovery of the Whole Revelation of St. John*, which occupied him five years. His earliest studies in mathematics were directed to the development of the sciences of algebra and arithmetic. In 1594 he had already conceived the general principles of logarithms, and he spent the next twenty years in developing the theory. During that period he invented the notation of decimal fractions. In 1614 he published his famous work *Mirifici Logarithmorum Canonis Descriptio*, containing an explanation of the nature and use of logarithms. He died at Merchiston on April 4th, 1617. At the time of his death he was engaged on propositions for the solution of spherical triangles.

Napier, MACVEY, writer and editor, was born on April 11th, 1776, at Kirkintilloch, Dumbartonshire, Scotland. He proceeded to the University of Glasgow in 1789, and two or three years later went to Edinburgh to study law. He was admitted to the Society of Writers to the Signet, and became their librarian in 1805. In the same year he began to contribute to the *Edinburgh Review*. In 1814 he undertook the control of a supplement to the sixth edition of the *Encyclopædia Britannica*, which was finished in 1824. In this year he became first Professor of Conveyancing in Edinburgh University, having held the lectureship since 1816.

In 1826 he edited the seventh edition of the *Encyclopædia Britannica*, and completed the work in 1842. On Lord Jeffrey's resignation in 1829, he succeeded to the editorship of the *Edinburgh Review*, and in 1837 was appointed one of the principal Clerks of Session, in Edinburgh. He was F.R.S. of London and Edinburgh. He died February 11th, 1847. In 1853 was published his *Remarks on the Scope and Influence of the Philosophical Writings of Lord Bacon*, together with a *Life of Raleigh*.

Napier, ROBERT CORNELIS (LORD NAPIER OF MAGDALA) field-marshal, was born in Colombo, Ceylon, on December 6th, 1810, and educated at Addiscombe for the Indian service. He entered the Bengal Engineers, and was engaged in the Sutlej campaign (1845-6), and also in the Sikh War (1848), being engineer-in-chief at the siege of Multan, and taking part in the battle of Gujrat. He afterwards superintended the construction of many of the most important public works in the Punjab, his labours being suspended in 1852 and 1853 to take the command of an expedition against the frontier tribes. In 1856, he went on furlough to England, and, on his return to India next year, found the Mutiny in progress. He was at once made military secretary and chief of the adjutant-general's department with Sir James Outram, and was engineer of the works by means of which Sir Colin Campbell relieved Lucknow. He was employed by Sir Hugh Rose against Tantia Topce, whom he signally defeated at Jaora Alipur, and who was captured and executed in 1859. Napier was second in command in the Chinese campaign of 1860, and in 1865 was commander-in-chief of the Bombay army. His expedition against Theodore of Abyssinia in 1868 and the capture of Magdala brought him a peerage and pension. He returned to India as commander-in-chief in 1870, was promoted general in 1874, became Governor of Gibraltar in 1876, was made field-marshal in 1883, and was appointed Constable of the Tower in 1886. He died in London on January 11th, 1890.

Napier, SIR WILLIAM FRANCIS PATRICK, general and historian, was born at Celbridge, co. Kildare, Ireland, on December 17th, 1785. Entering the army as a lad, he was present at Corunna (1809), and many of the battles of the Peninsular War, being wounded at the Coa (1810), Casal Novo (1811, dangerously), and at the Nive (1813). For his intrepid and gallant stand in the action at the Coa he was thanked on the field. Retiring from active service in 1819, he was made C.B., and devoted himself to painting, sculpture, and literature. Between 1828 to 1840, appeared the six volumes of his *History of the Peninsular War*. It attained to deserved popularity on account of its accuracy, impartiality, and readable style, and has become an English classic. In 1841 he was promoted major-general, and in the following year became lieutenant-governor of Guernsey. During the five years' term of his post, he found time (1845) to write his history of *The Conquest of Scinde*, which had been so successfully accomplished by his brother, to whose justification he returned in his

History of the Administration of Scinde (1851). His *Life and Opinions of General Sir C. J. Napier* is too biassed to be satisfactory or valuable. In 1848, Napier had been created K.C.B., and was promoted lieutenant-general in 1851, and general in 1859. He died in London on February 10th, 1860.

Naples (Italian, *Napoli*), a town in South Italy, capital of the province of Naples, and once capital of the kingdom of Naples, is one of the chief naval and military ports of Italy. It is situated on the northern arm of a beautiful semi-circular bay on the west coast, and is 117 miles S.E. of Rome. The town lies partly on the shore and partly on the hill-slopes, having on the west the heights of Posilipo, and on the east Vesuvius. The best view of it is from the heights, or from the

the road of communication being the Corso Vittorio Emanuele. The oldest and most densely peopled quarter is in the eastern part of the city, and is intersected by the Via di Roma, one of the most remarkable thoroughfares in Europe. The cathedral of 1272, built on the sites of ancient temples has granite pillars and ancient marbles, and contains relics of St. Januarius. The Royal Palace possesses some good paintings, and the Palace of Capo di Monte has modern pictures, sculptures, and fine gardens. The Museo Nazionale contains a library of 275,000 volumes, valuable MSS., the Farnese paintings and sculptures, and relics of Herculaneum and Pompeii. Educational, literary and scientific institutions abound, the university founded in 1224, with an average annual attendance of 5,000 students, being of special import-



From a photograph by Frith & Co., Reigate.
THE BAY OF NAPLES, WITH VESUVIUS.

sea. Its invigorating climate, charming environs, and delightful position have found voice in the saying "See Naples and die." The former insanitary conditions are being gradually removed, though the habits of the lazzaroni and others of the lower classes yet leave plenty of room for improvement. There are three forts—of no practical use now—St. Elmo, on the hill to the west, Castel Nuovo, near the sea, and Castel dell'Ovo, on a rocky islet which is joined by a jetty to the mainland. The city, which is divided by a steep ridge from Castel dell'Ovo to St. Elmo, is three miles long by two broad, not counting the suburbs, and has an arsenal, a naval harbour, and a mercantile harbour. There are several gates—some now inside the city—the Capua gate being adorned by sculptures in relief. The streets are regular and clean though narrow, and are well paved with blocks of lava. There are many fountains and fine promenades, among the latter being the Riviera di Chiaja, close to the Villa Nazionale Gardens. The fashionable quarter is to the west,

ance. The manufactures comprise woollens silks, linens, gloves, soap, perfumery, pottery, carriages, and hats, besides macaroni and vermicelli, articles in coral and lava, and cameos. In the neighbourhood are many objects of interest the tomb of Virgil, Vesuvius, the remains of Herculaneum and Pompeii and ancient villas temples, and tombs. That the proximity of Vesuvius has also a serious disadvantage, however, was made evident during the eruption of 1906, when the city was covered with scorice and dust from the volcano and its streets crowded with panic-stricken villagers fleeing from the torrents of molten lava. There is a good export trade, though the harbour is insignificant. The population is unique in its character. Originally a Greek colony the city was called Neapolis (New City) to distinguish it from Parthenope. Hadrian and Constantine in later times did much towards embellishing it, and in 536 it was pillaged by Belisarius, and in 542 by Totila. It belonged successively, but at considerable intervals, to the

Normans, the German Emperor, and to the kings of France and Spain. United with Sicily to form the Kingdom of the Two Sicilies, it was ruled by Spanish viceroys till 1707, when it was seized by Austria. In 1735 it was handed over to Don Carlos, third son of Philip V. of Spain, founder of the Bourbon dynasty. The French Republicans invaded it and made it the Parthenopean Republic, the king, under the convoy of Lord Nelson, retiring to Palermo (1799). Seven years later Napoleon invaded it and proclaimed his brother Joseph king. When Joseph became king of Spain, the crown was given to Joachim Murat, who wore it till his execution in 1815, when the Bourbons were restored. After being misgoverned for many years by its Bourbon kings—of whom “Bomba,” in 1851, was the subject of one of Mr. Gladstone’s famous indictments—it was taken by Garibaldi in 1860 and annexed to the kingdom of Italy in the following year. The Bay of Naples is 20 miles across from Cape Miseno to Cape Campanella, and extends 20 miles inland. At the northern part of the entrance are the islands of Ischia and Procida, and at the south is Capri. Pop. (1901), 563,540.

Napoleon, a round game at cards, usually played by from two to five or six persons. Five cards are dealt, one at a time, to each of the players, who declare in turn, beginning at the dealer’s left, how many tricks they will attempt unless they elect to pass. The player who declares for the largest number of tricks begins, and the others must follow suit if possible, the card led by the declarer indicating the trumps suit. The cards rank as in whist. If the declarer makes his tricks, he receives the agreed-upon stake for every trick from each of the other players, and if he fails, he pays a corresponding amount to them. A declaration of *Nap*—i.e. the whole of the five tricks—overrides all others. But if Nap be made the declarer receives double stakes from each, paying only single stakes if he fail. Errors in deal, or a card or cards exposed in the deal, necessitate a fresh shuffle and deal. The players deal in turn. A player revoking must pay for all the party should the declarer win, but if the declarer lose, he will pay all save the revoker. When two or three play, it is usually agreed to pass if none of the party can declare more than two tricks. Without the gambling element the game has little interest.

Napoleon Bonaparte, emperor of the French, often styled the Great, was born at Ajaccio, Corsica, on August 15th, 1769. He belonged to a family of Greek origin that for some generations had settled in Corsica, and was educated at the military college of Brienne, where he formed the friendship of De Bourrienne, his future secretary and biographer. The death of their father reduced the Bonaparte family to poverty, and Napoleon, on joining the artillery regiment of La Fère in 1785, found difficulty in gaining a bare subsistence. It was probably owing to his early years of severe economy and self-denial that he gained the strength of mind and will so thoroughly developed at the outbreak of the Revo-

lution. In 1793 Bonaparte was employed with the rank of captain at the siege of Toulon, at that time held by a British force in conjunction with French Royalists. As commander of the artillery he gained by force of character an ascendancy over Carteaux, the general. Having persuaded the latter to attack Fort L’Aiguillette, commanding the two harbours of Toulon, the withdrawal of the British naval squadron and the evacuation of the town followed the capture of this vital point. This success gained for Bonaparte the rank of general of brigade and employment with the Army of Italy, where he earned additional laurels (1794). Meanwhile the torrent of revolutionary fury had spent its force. Robespierre had been executed, and the Reign of Terror was at an end. From the outset Napoleon had profoundly mistrusted the enthusiasm of the Jacobins, while his mind revolted from their excesses. Yet motives of policy and admiration of their success had induced him to make friends with men of the most extreme faction, among whom the younger Robespierre had been his intimate companion.

The young general was now arrested as a Terrorist, and it was only after days of the utmost anxiety that, nothing having been proved against him, he was released. In 1795 Bonaparte was summoned to Paris, but having declined service in la Vendée, his name was struck off the active list; called in, however, shortly afterwards to subdue the revolt of the Sections, his success was rewarded by his appointment as Commander-in-Chief of the Army of Italy. In March, 1796, having a few days previously married Josephine, widow of General de Beauharnais, Bonaparte assumed command. His troops, to the number of about 34,000, were occupying the passes of the Northern Apennines. Opposed to them was an allied force of Austrians and Sardinians of rather greater strength, but widely extended. Concentrating with rapidity, the French general threw himself against the allied centre, broke it at Montenotte and Millesimo, overtook the Sardinians, who were retiring separately northwards, at Mondovi, defeated them again, and before the end of April had forced their sovereign to make peace under the very walls of Turin. Turning without delay to the Austrians, he moved swiftly along the valley of the Po, forced the passage of the Adia at Lodi, and entered Milan in triumph on the 14th May. Nor did he even then rest on his laurels, but with a succession of victories at Lonato, Castiglione, Arcola, and Rivoli completed the discomfiture of the enemy, and closed his campaign by the capture of Mantua (February, 1797). He was now ordered to Rome, where he gained an easy conquest over the Papal troops. Having returned to Mantua, and being reinforced from France by 20,000 men, Bonaparte next turned his arms northwards, violated without hesitation the territory of Venice, forced the passage of the Tagliamento, entered Carinthia, nor halted until, when within 30 miles of Vienna, the Austrian Emperor sued for peace, the terms of which—including the appropriation of Venice by Austria—were ratified at the treaty of Campo Formio (October, 1797).

On his return to France Bonaparte was first offered command of the Army of England, and afterwards that of an expedition to Egypt, undertaken apparently by the Directory at his own instigation, with the rather vague idea of opening up communication with Tippoo Sahib in India, and possibly of founding an Eastern Empire. Having defeated the Mameluke forces near the Pyramids and occupied Cairo (July, 1798), the general proceeded to invade Syria, but was repulsed from the walls of St. Jean d'Acre by Captain Sidney Smith, acting in conjunction with Djeddar Pasha; and, his troops being decimated by the plague, Bonaparte was compelled to return to Egypt. Here he received intelligence that matters had been going ill for France both at home and abroad. The Austrians had reoccupied Italy, and the government of the Directory was evidently shaken to its foundation. He resolved to return home, but the chances of doing so appeared desperate. Shortly after the landing in Egypt his fleet had been destroyed by Nelson at Aboukir (August, 1798), and the Mediterranean swarmed with British cruisers. Accompanied by a few friends, he nevertheless made the venture and, after many hairbreadth escapes, landed at Fréjus in October, 1799. It had not been until after Lodi that Bonaparte had cherished the idea of becoming ruler of France. The favourable opportunity had now occurred; encouraged by the acclamations of the people and assured of the support of the army, by a *coup d'état* he speedily overthrew the Directory, and established himself as First Consul with Siéyès and Roger-Ducos for his colleagues. Called to supreme power by the enthusiasm of the people, possessed of almost despotic authority, and trampling under foot the embers of the Revolution, a series of laudable acts followed his elevation. *Emigrés* were released from prison, the law of hostages was abolished, and 9,000 State prisoners received their liberty. It was now time to turn to Italy, where matters had gone badly for the French. Massena, commander-in-chief, was shut up in Genoa; Suchet with difficulty held the line of the Var. General Mélas, with the Austrian main body, occupied Piedmont. With brilliant conception and execution the First Consul crossed the Great St. Bernard, struck the neck of the Austrian communications and inflicted a crushing defeat on Mélas at Marengo (June 14th, 1800.) A capitulation ensued, and Bonaparte returned to Paris. North of Switzerland Moreau's army proved equally successful, and gained the decisive victory of Hohenlinden. Prolonged negotiations followed, but at length by the treaties of Lunéville and Amiens (March, 1802) a general peace was concluded. The First Consul was now occupied with matters of internal administration; the Cadastre, or Land Survey, was reformed, the Code Napoléon established, finances were put in order. France appeared to be inaugurating a new era, but mistrust of Great Britain and complaints freely reciprocated proved too strong, and in May, 1804, war was again declared. The object of Bonaparte was now to invade England; an army of 130,000 men was assembled near Boulogne, and the First Consul

repeatedly declared that, given the command of the Channel for forty-eight hours, England was at his mercy. Meanwhile usurpation of power had been attended by its usual consequences. A conspiracy, headed by Georges Cadoudal and the Chouan chiefs, had been detected. Many distinguished persons, including Generals Pichegru and Moreau, were implicated. A previous attempt at assassination had narrowly failed, and the Consul's life was evidently in instant peril. Cadoudal and a few others were executed, but still stronger measures followed. The Duc d'Enghien, son of the Duc de Bourbon, was seized within the territory of Baden, forcibly conveyed to Vincennes, arraigned before a military court at midnight, and immediately shot (1804). As the year wore on, it became evident that the First Consul contemplated assuming the crown. In May the Senate declared Napoleon Emperor of the French, the decree being subsequently ratified by the almost unanimous vote of the nation, wearied of the despotism and incompetency of the republic and assured that a monarchy could alone produce tranquillity and order. The coronation took place in Notre Dame in December, while in the following year Napoleon assumed in addition the iron crown of Lombardy. In August, 1805, the utter failure of the Emperor's naval combinations, culminating in the decisive battle off Trafalgar, showed that the contemplated invasion of England was an impossibility. Without delay he resolved to transport this army, now in the highest state of efficiency, to take the field against Austria and Russia. His march to the Danube stands out as a model of speed, calculation, and effect. On the 20th of October the Austrian general, Mack, surrendered at Ulm with 30,000 men. Three weeks later the Emperor entered Vienna, and, on the 2nd of December, was face to face with the united armies of the Allies at Austerlitz. An attempt to encircle his right flank was met by a vigorous attack on their weakened centre, which broke and was carried away in headlong flight, while the left wing of the Allies, assailed in front and flank and driven to retire across the frozen waters of Lake Satschau, found a watery grave beneath the ice quickly broken in pieces by the remorseless artillery of the French. The Russians retired northwards while the Austrians concluded a separate peace.

During 1806 Napoleon achieved his favourite project of a confederacy of the Southern German States in alliance with France and called the Confederation of the Rhine. Meanwhile the Prussians had taken fire at the insults and exactions of French troops in German territory, and early in October declared war. The French army, still on the right bank of the Rhine, was instantly put in motion and the Prussian forces were annihilated on October 14th, 1806, at the battles of Jena and Auerstädt. By this time the Russian army had again taken the field. Napoleon, entering Poland, encountered it at the indecisive fields of Pultusk and Eylau, but in the following June (1807) the decisive battle of Friedland, coupled with the refusal of the British Whig Government to render assistance, determined the Russian Emperor to make overtures

of peace, and the Treaty of Tilsit was concluded in July, 1807, by the terms of which Prussian Poland was converted into the Grand Duchy of Warsaw and the Prussian provinces on the left bank of the Elbe were formed into a kingdom of Westphalia, while mutual advantages were reaped by France and Russia.

Napoleon now set to work to ruin Great Britain through her commercial trade. By means of what was termed the "Continental system" he attempted to exclude British goods from Continental ports. His scheme proved a failure, and even at the time when he was boasting of having struck a mortal blow his own armies were being clothed from Leeds and Northampton.

Meanwhile difficulties were arising in Spain. King Charles IV. having abdicated, his son Ferdinand placed himself in Napoleon's power and was detained a prisoner. The Emperor seized the pretext for interference. An army under Murat occupied Madrid; insurrections quickly broke out, and the French abandoned the capital. At this crisis Napoleon, finding his presence indispensable, crossed the frontier with 300,000 men, and once more captured Madrid (December 3rd, 1808). Alarming news soon reached him; a British force under Sir John Moore had advanced from Portugal, and was threatening the vital point of his line of communications. Quitting Madrid on the 20th, and crossing the Guadarrama Mountains in a tempest of hail and snow, the Emperor traversed 200 miles in ten days in the hope of cutting off his daring adversary. Moore, however, aware of his danger, had made good his retreat, and the blow failed. On the 1st of January, 1809, intelligence arrived of the imminence of hostilities on the part of Austria. Napoleon flew to his army in Germany, concentrated it in the valley of the Danube, gained the victory of Eckmühl and occupied Vienna (May 13th). Repulsed by the Archduke Charles in an attack on Essling, the Emperor's position was for a time one of great danger, until, on the 6th of July, the victory of Wagram, followed by the Treaty of Vienna (October 14th), terminated the war. Meanwhile, Pius VII. having excommunicated Napoleon (June 11th), the Emperor retaliated by removing the Holy Father from Rome to Grenoble and afterwards to Savona.

In 1810, Napoleon, desirous of an heir, divorced Josephine and married (April) Maria Louisa, daughter of the Emperor of Austria. He now contemplated resuming command in Spain—where, in spite of incredible difficulties, Wellington had beaten his generals in battle after battle—but troubles with Russia, the result of mutual jealousy and mistrust, arose. In 1812 the climax was reached. Napoleon, with an immense army, of which his allies contributed the greater part, crossed the Niemen, gained the indecisive battle of Borodino, and occupied Moscow on the 14th of September. During the same night fires broke out in all directions and the city was untenable. The Russians declined all negotiations. Napoleon's hopes were frustrated; winter was at hand. A retreat became inevitable and was begun on 26th of October. Disasters accumulated; news arrived of the British

occupation of Madrid. The French army had already lost four-fifths of its numbers, and the strength of the Russians enforced a retreat over the same line—now devastated—by which the French had originally advanced. Smolensk was reached; but the retreating army soon degenerated into a mob of stragglers, and the terrible passage of the Beresina (November 28th) completed its wreck. On the 5th of December the Emperor, who had received news of a dangerous conspiracy at Paris for his overthrow, found himself compelled to quit the army and resume the government of France. The miserable remnant of the Grand Army, abandoning successively the lines of the Vistula and Oder, halted at length on the left bank of the Elbe. A crisis was at hand. Prussia flew to arms. The efforts of Napoleon gathered 200,000 men to his standard. Joining the army in person, he defeated the Allies at Lützen (May 2nd, 1813), reoccupied Dresden, and followed up his success by a victory at Bautzen (May 20th). The Allies retreated to the Oder, and an armistice resulted. Negotiations ensued, but in August the Allies, with the adhesion of Austria, again took the field. Notwithstanding a defeat at Dresden, their numerical superiority began to tell. The French concentrated at Leipzig, and for two days (October 16-18) held their ground in the face of overwhelming numbers in the "great battle of the nations." A retreat could no longer be avoided, and early in November the shattered remains of the army recrossed the Rhine into France. The campaign of 1814 shed a last ray of glory upon Napoleon's arms. Never had his talents been displayed with greater brilliancy. Pivoting alternately between the Aube and Marne, he struck blow after blow at the invading armies. Ultimate success might still have attended him, but the capitulation of Paris and the utter weariness of war shown by the French nation caused his abdication (April 6th, 1814). Escaping in 1815 from Elba, whither he had been exiled, he landed in France (March 1st), and again occupied the imperial throne. The Allied Powers refused to acknowledge him and their armies once more surrounded the frontier. Napoleon's only chance was to take the offensive and separate the combined British and Prussian forces assembling in Belgium, but the numbers at his command (125,000) were quite inadequate to make head against the 206,000 of his opponents, and, though the rapidity of his blow gave him a momentary advantage, the battle of Waterloo (June 18th) proved a deathblow to his hopes. After a second abdication (June 22nd) he surrendered (July 15th) at Rochefort to Captain Maitland of the *Bellerophon*, and was ultimately conveyed to the island of St. Helena, which he reached on October 17th, and where he died on May 5th, 1821.

Napoleon II., entitled King of Rome, son of Napoleon I. and the Empress Maria Louisa, was born in Paris on March 20th, 1811. His family name was Francis Charles Joseph Bonaparte. When the Allies approached Paris in 1814, the child was removed to Rambouillet and then to Blois. Napoleon abdicated in his son's favour, but of course the

document was inoperative. The boy prince was taken to Schönbrunn, where his grandfather showed him some affection. In 1818 he was created by imperial patent, Duke of Reichstadt. In his twenty-first year he was attacked with acute phthisis, and died on July 22nd, 1832.

Napoleon III., CHARLES LOUIS NAPOLEON BONAPARTE, the son of Louis Bonaparte, King of Holland, and of Hortense Beauharnais, was born in Paris on the 20th of April, 1808. After the downfall of the First Empire the young prince lived with his mother at Augsburg, and then near Lake Constance. In 1830 he took part in the Papal Revolution. On its failure he fled to France, but was compelled to leave, and after a stay in England, again went to Constance. In 1831 the Polish Crown was offered to him, but the Polish movement proved abortive. The death of the Duke of Reichstadt (1832) made Louis head of the family. In 1836 he made an attempt to seduce the garrison of Strasburg, and, being made prisoner, was sent to the United States, but his mother's fatal illness brought him back to Europe the next year. France called on Switzerland to extradite him and to prevent complications Napoleon went to England. In 1838 he published *Idées Napoléoniennes*. The enthusiasm aroused in France by the home-bringing of Napoleon I.'s remains to Paris in 1840, led Louis to make his descent on Boulogne, the result of which was his trial and condemnation to imprisonment in the fortress of Ham. Here he wrote and studied much till his escape in 1846, when he came to England. In 1848 he went to Paris and professed republican principles, but again retired to England. Returning to Paris, he was elected deputy, and, by means of the popular vote, was elected Prince-President the same year. In 1851 he was elected President for ten years, and in 1852 by the *coup d'état* made himself Emperor. In 1853 he married Eugénie de Montijo, and in 1854 became Great Britain's ally in the Crimean War. In 1858 a coolness arose between France and Great Britain, but in 1859 Queen Victoria visited the Emperor at Cherbouurg. In this year he joined Sardinia against Austria, and the campaign, after the victories of Magenta and Solferino, resulted for France in the acquisition of Nice and Savoy. In 1860 Napoleon took part with Great Britain in a joint expedition against China, and in 1861, France, Great Britain, and Spain made common cause against Mexico. The last two, however, withdrew, and Napoleon alone entered on the expedition under Bazaine which ended in the appointment of Maximilian as Emperor of Mexico and the tragedy of Queretaro. In 1866 troubles began with Prussia on Napoleon's proposing a reconstruction of the French frontier. The next year the ill-feeling was increased by the proposal of ceding Luxembourg to France, a proposition which was settled by the neutralisation of Luxembourg, and in 1870 the question of electing a German Prince to the Spanish throne precipitated the inevitable war. At Saarbrück the Emperor and his son were present; but the shutting up of one French army in Metz, and the defeat of another at Sedan, finished the campaign. Napoleon surrendered, and remained

a prisoner at Wilhelmshöhe till the spring of 1871, when he joined his wife and son at Chislehurst, in the English county of Kent, where he died on January 9th, 1873. His son EUGÈNE LOUIS JEAN JOSEPH, PRINCE IMPERIAL, born in Paris, March 16th, 1856, was educated at Woolwich, and killed at Ulundi, Zululand, in the war against the Zulus (June 1st, 1879), in which he served as a volunteer.

Narbonne (Roman *Narbo*) a town of southern France, near the Mediterranean, in the department of Aude. The town is on a plain surrounded by hills, and is 33 miles E. of Carcassonne. The streets are irregular and the Robine Canal passes through the town. Among the promenades are the Esplanade and the Allée des Soupers. The 13th-century church of St. Just, the town-hall with a lofty tower, the barracks, and hospital are the chief public buildings. The principal industries are the manufactures of verdigris, linen, hosiery, and leather. There are also distilleries, and dye-, brick-, and tile-works. There is a trade in honey, for which it has long been celebrated, corn, wine, brandy, oil, salt, and saltpetre. Though Narbonne was the first formed of the Transalpine colonies and capital of Gallia Narbonensis, there are few Roman remains. Pop. (1901), 24,607.

Narbrough, SIR JOHN, admiral, was born at Cockthorpe, Norfolk, England, in 1640. Having entered the navy, he became a lieutenant in 1664, and in 1666, for gallantry in the action with the Dutch, was made a captain. In 1669 he led a voyage of discovery to the South Pacific, but, being hindered by the Spaniards of South America, returned to England. He would have sailed again had not a new Dutch War broken out in 1672. The Duke of York chose Narbrough as his flag-captain, and, losing his captain of the fleet at the battle of Solebay, promoted him to the vacant post. Later in the year Narbrough was sent with a convoy to the Strait of Gibraltar, and soon after his return he was knighted and appointed rear-admiral of the red. He cruised with success, and in 1674 was again sent to the Mediterranean. He did not finally return to England until 1679. In the following year he became a Commissioner of the Navy. He died at sea in 1688, while engaged in a voyage in West Indian waters.

Narcissus, son of the river-god Cephissus and the nymph Liriope, was renowned for his beauty. One day, beholding his reflection in the stream, he became so enamoured of it, that he could not leave the sight, and pined away with longing. The gods changed him into the flower that bears his name.

Narcissus, a genus of Amaryllidaceæ, including twenty or thirty beautiful species, natives of Europe and Asia, nearly all of them easily cultivated in England. They are bulbous plants, some having flat, and others round, rush-like leaves, whence the name Jonquil, a corruption of *junci-folius*, "rush-leaved." Their hollow radical scapes bear either one flower, as in the common-

daffodil (*N. pseudo-narcissus*), or several, as in *N. Jonquilla* and *N. Tacetta*, the flowers, in either case, having a sheathing membranous spathe. The perianth is generally some shade of yellow; but in the Poet's or Pheasant's-eye *Narcissus* it is white. It varies much in the length of its tube and the size and direction of its six segments, and in the size, shape, and colour of its characteristic



NARCISSUS.

"coronet" or *corona*, which encloses the six stamens, and the style of the inferior three-chambered ovary. The coronet is hardly ever of the same shade as the perianth. In the white Poet's *Narcissus* it is yellow and edged with red. This coronet originates apparently by co-radial chorisis from the perianth. Their early spring

beauty has made the genus a favourite with all poetic minds. Mahomet wrote, "He that has two leaves, let him sell one and buy a flower of the narcissus; for bread is the food of the body, but narcissus is food for the soul"; and it was of daffodils that Keats wrote, "A thing of beauty is a joy for ever." The single lovely British species, the common daffodil (*N. pseudo-narcissus*), is also called the Lent lily.

Narcotics (Greek *narke*, "a deep sleep"), drugs which produce general anesthesia and are employed for the purpose of lulling pain or producing sleep, *e.g.* opium, chloral and the bromides.

Narcotine, an alkaloid which occurs together with morphine in the seeds of *Papaveracea*, *i.e.* the poppy growth of plants. It is hence found in opium, from which source it may be extracted. It forms white, glistening crystals, which melt at 176°. It possesses the formula $C_{20}H_{23}NO_7$, and was once supposed to be the narcotic principle of opium, but has been ascertained to possess hardly any narcotic power.

Nardoo, the Australian name for *Marsilia macropus*, one of the *Rhizocarpaceæ* or *Hydropterideæ*, a small group allied to the club-mosses. They have delicate quatrefoil leaves on slender stalks, and small sporangia containing starchy spores which are used as a bread stuff. The plant is abundant in swamps in the interior of Australia, where the survivors of the ill-fated Burke and Wills expedition starved on its sorry produce.

Nares, Sir George Strong, admiral and Arctic explorer, was born on April 24th, 1831. He entered the navy in 1845, and, as mate, shared, in 1852-54, in the search for Sir John Franklin. After service during the Crimean War he commanded the *Salamander* in the survey of the north-eastern coast of Australia, and the *Challenger* during her

long scientific cruise until, in 1875, he was recalled to conduct the Polar expedition of 1875-76, the Prince of Wales (afterwards Edward VII.) attending the "God-speed" meeting at the Royal Geographical Society in London. He wintered in 82° 27' N., and one of his sleighing parties penetrated to 83° 86' N. On his return he was made K.C.B. (1876). In 1878-79 he commanded the *Alert* while engaged in surveying the Pacific, and in 1892 became vice-admiral on the retired list. From 1879 onwards he acted as a professional member of the Harbour Department of the Board of Trade.

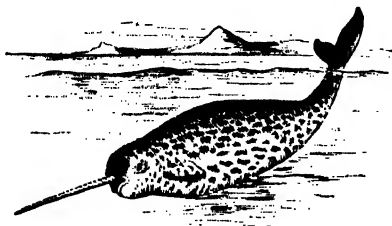
Narragansetts, North American aborigines, a branch of the Algonquin family, which was formerly dominant in what are now the states of Massachusetts and Rhode Island, where the name still survives in Narragansett Bay. Like the neighbouring and allied Massachusetts, they have long been extinct.

Narses, statesman and general, was born about A.D. 478. He was a eunuch and was probably sent to Constantinople as a slave. Justinian promoted him to the office of chamberlain and keeper of the privy purse. In 538 he was at the head of an army sent to aid Belisarius to expel the Goths; but the generals quarrelled, and Narses was recalled. In 552 he was sent to Italy against Totila, whom he defeated; and having captured Rome, he drove out the Goths, and was governor of the country for fifteen years. His exactions aroused discontent and the complaints against him caused his deposition. He is said to have then invited the Lombards to invade Italy. He lived at Naples and died at Rome about 573.

Narva, a town of Russia, 100 miles W.S.W. of St. Petersburg, on the Narova. A bridge connects it with Ivanorod on the opposite side of the river. The chief buildings are the cathedral, town-hall, and the old castle. The falls on the stream have provided power for driving saw-mills and cotton and other factories. Here, on November 30th, 1700, Charles XII. of Sweden defeated a greatly superior force of Russians under Peter the Great. Pop., 17,000.

Narvaez, Ramon Maria, Duke of Valencia, statesman and general, was born in Loja, Andalusia, Spain, on August 5th, 1800. He served in the army with distinction and in 1830, under Espartero, pursued and routed Gomez. His popularity led him to enter into politics and he became the rival of Espartero. In 1838 he took part in an abortive rising of Progressists and for five years had to stay abroad. Then, taking advantage of Espartero's unpopularity, he returned to Spain and, at the head of insurgents, entered Madrid as a victor in 1843. In the next year he became Prime Minister and Queen Isabella made him Marshal and Duke of Valencia. In 1846 the government was overthrown, but he was often recalled to power, becoming more and more Conservative till his last Ministry in 1866. Towards the end of his life he tried to advance the interests of Queen Isabella. He died on April 23rd, 1868.

Narwhal (*Monodon*), a genus of toothed whales, of the Dolphin family, with one species (*M. monaceros*), from the Arctic seas of both hemispheres. The adult male possesses a long, spirally-twisted tusk or "horn," really the abnormally developed canine tooth of the left side; the tooth on the right is very rarely developed, though this sometimes occurs. It is rarely present in females, though Scoresby found one with a tusk over four feet long. The use of these



NARWHAL.

weapons is unknown. The body of a full-grown male may be 14 feet long, and the tusk from 6 feet to 10 feet. The general colour of the young is bluish-grey; older animals are lighter with dark spots. Narwhals are hunted for the oil they yield and the ivory of their tusks.

Naseby, a village in Northamptonshire, England, 12 miles N. of Northampton, celebrated for the total defeat which Charles I. and Prince Rupert here sustained at the hands of Fairfax and Cromwell on June 14th, 1645.

Nash, JOHN, architect, was born at Cardigan, Wales, in 1752. He was articled to Sir Robert Taylor and among his earlier works he designed the west front and chapter-house of the cathedral of St. David's (1798). In 1811 he gained the premium of £1,000 for the most suitable plans for a public park in Marylebone, London, and he proceeded to lay out Regent's Park and designed the adjoining terraces. He also projected the Regent's Canal connecting the Thames at Limehouse with the Grand Junction Canal at Paddington, the work being finished in 1820. Simultaneously the best-known of all Nash's works was carried out. This was the imposing thoroughfare of Regent Street with the Quadrant and All Souls' Church, Langham Place. He completed the laying out of St. James's Park and largely reconstructed Buckingham Palace, for which he had designed a great entrance archway modelled on the arch of Constantine at Rome. This structure was removed to Hyde Park in 1850-1 and is commonly known as the Marble Arch. He died at East Cowes, Isle of Wight, on May 13th, 1835.

Nash, RICHARD, called BEAU NASH, was born at Swansea on October 18th, 1674, and educated at Carmarthen grammar school and Jesus College, Oxford. He entered the army, but soon gave it up for law, becoming a student of the Inner Temple in 1693. He managed the pageant performed

before William III. in the Middle Temple in 1695, which was so successfully arranged that the king offered him a knighthood, which he contrived to decline without causing offence. He then took to living by his wits. Recognising that Bath, which had become a Society resort in 1703, might be vastly improved, he induced the Corporation of the city to invest him with full powers, and in a few years had converted the place into the principal haunt, both for health and pleasure, of *haut ton*. He wielded his autocratic authority with much diplomacy, however, and was regarded as the arbiter of fashion, master of ceremonies, and "King of Bath." The ceaseless flattery turned his head and his inordinate vanity led him into lavish extravagance, which was in no way lightened by his gambling propensities. Losing caste, he gradually fell into low circumstances until, in 1758, he accepted a pension of £10 a month from the Town Council. He died in Bath on February 3rd, 1762, and was buried with considerable pomp in the Abbey.

Nash, THOMAS, satirist and dramatist, was born in Lowestoft, Suffolk, England, in November, 1667, and educated at St. John's College, Cambridge. After a short tour in France and Italy, he settled in London in 1688. Next year appeared his sarcastic work *The Anatomy of Absurditie*, in which he gave evidence of his turn for satire, a gift of which he made ample use during the following years in the Martin Mar-Prelate controversy, directing his squibs at the Puritan pamphleteers, and winning some renown by his *Pierre Penitence his Supplication to the Devil* (1692). A year later appeared his *Christ's Tears over Jerusalem*, in which he affected to be weary of the barren strife. In 1694 was published the *Unfortunate Traveller, or the Life of Jack Wilton*, the first English novel of adventure, the quasi-realism of which proclaims him the predecessor of Defoe. Returning to satire, he and Gabriel Harvey fell abusing each other until, in 1699, the licensers of the press silenced both partisans. In 1694 Nash had completed Christopher Marlowe's *Tragedie of Dido*. His play of the *Isle of Dogs* was too satirical for the Privy Council, and he was thrown into the Fleet prison, where he lay for several months, being banished from London on his release. In 1699 appeared *Nash's Lenten Stuffe*, a comic panegyric of the herring and laudation of Great Yarmouth. *Summer's Last Will and Testament*, written just after his imprisonment, was not published till 1600, and in 1601 he died, seemingly in poverty and distress.

Nashua, capital of Hillsboro county, New Hampshire, United States, on the Merrimac, 14 miles N.W. of Lowell. The chief manufactures comprise cotton, iron and steel goods, carpets and paper. The church of St. Xavier is the handsomest structure in the State. Pop. (1900), 23,898.

Nashville, capital of Davidson county and the State of Tennessee, United States, on both banks of the Cumberland. The principal buildings are the State Capitol, erected on a commanding site, and with a tower 200 feet high, and the Parthenon.

The chief industries include cotton and woollen goods, flour, soap and saddlery, besides lumber and engine- and carriage-making. The town is noted as an educational centre, the leading institutions being Nashville University (1806), Vanderbilt University (1873), Fisk University (1867) for the training of coloured teachers, Central Tennessee College (1866), also for coloured students, and Roger Williams University. Near Nashville are the Hermitage (the home of Andrew Jackson) and a national cemetery. On December 15-16th, 1864, the Confederates, under Hood, were severely defeated at Nashville by the Federals, under George H. Thomas. Pop. (1900), 80,865.

Nasik, a town of the Bombay Presidency, India, 30 miles from the source of the Godavari, and 117 miles N.E. of Bombay. It is a sacred town and pilgrimages are made to it. Paper and cotton are manufactured, and there is much brass- and copper-working. Nasik was once a Mahratta capital. Pop. estimated at 27,000. The district, of the same name, contains 5,940 square miles, and a pop. (1901) of 819,575. The chief crops are millet, pulse, wheat and oil seeds, and the leading industries are cotton- and silk-weaving and flour mills.

Naskapi (Naskwapi), North American Indians of Algonquin stock and speech. They are scattered in small groups throughout the central and south-western parts of Labrador, in Rupert Land, about Lake Mistassini and other parts of north-east Canada. Formerly much more numerous, they are now gradually becoming extinct. Some are Roman Catholics, but the majority remain pagans and polygamists, living by hunting and fishing, and cultivating no land. In their language, which is a Cree dialect, *Naskapi* means the "Erect," that is, "Men."

Nasmyth, ALEXANDER, painter, was born in Edinburgh, on September 9th, 1758. He was educated at the High School and studied art at the Trustees' Academy. Apprenticed to a coach-builder, he became a pupil of Allan Ramsay, the portrait painter, whom he accompanied to London. He returned to Edinburgh in 1787 and obtained considerable vogue for his portraits and in 1782-4 studied at the chief art centres in Italy. Introduced in 1787 to Robert Burns, he painted the famous portrait of the poet, now in the National Gallery, Edinburgh, and the replica of it in the London National Portrait Gallery. From further studies he painted (in 1827) the full-length portrait of Burns, also in Edinburgh. A decline of clients caused him to take up landscape- and scene-painting, and he also turned to architecture with considerable success, designing the Dean Bridge and the Temple of Hygeia at St. Bernard's Well, Water of Leith—both in Edinburgh. He died in his native city on April 10th, 1840. His eldest son, PATRICK, born in Edinburgh on January 7th, 1787, was a landscape painter whose skill and manner won him the name of the "English Hobbema." Since his death in London on August 17th, 1831, his reputation has greatly advanced, and his pictures command large prices at auctions.

JAMES NASMYTH, the portrait painter's youngest son, was born in Edinburgh on August 19th, 1808, and educated at the High School of Arts and the University. After spending some time with Henry Maudslay and subsequently with Joshua Field in London, he set up business on his own account, first in Manchester and later at Patricroft near that city. Here he designed the steam-hammer (1839), though it was not till he had seen his own machine in work at Creuzot that he took steps to patent it (1842), and it was only in 1843 that he used it in his own foundry. He designed many machine tools, such as the flexible shaft for driving small drills and the hydraulic punching machine. He seems to have been the first to suggest the use of a submerged chain for towing boats and to anticipate Palliser in proposing the use of chilled cast-iron shot. He took an active interest in astronomy, for the study of which he constructed some of his own instruments. He died in London on May 7th, 1890.

Nassar, a large branch of the Ghilzai Afghans in the Suleiman Mountains, about the Takht-i-Suleiman. They are pure nomads, with no fixed summer or winter camping-grounds, but perpetually wandering about between the uplands and low-lying valleys according to the vicissitudes of the seasons. They recognise no chiefs except during their warlike or peaceful expeditions, after which each family group resumes its independence and respects that of its neighbours.

Nassau, formerly an independent duchy in Germany, was annexed in 1866 to Prussia, and forms part of the province of Hesse-Nassau. The surface is uneven and fertile. The capital, Wiesbaden, and Ems are noted for their mineral springs.

Nassau, once known as NEW PROVIDENCE, a town on New Providence Island, Bahamas, and capital of the group. There is a large trade in fruit, sponges, cotton and salt. It is the headquarters of the Government, the seat of an Anglican bishop and in repute as a winter health-resort. Pop. estimated at 10,000.

Nassellaria, the third of the four orders into which Haeckel divided the class Radiolaria. The characteristics of the order are the silicious skeleton and the fact that the pores in this are limited to a pore area (or porochora) at one end of the main axis of the body. The order includes many familiar forms.

Nasturtium (said to be derived from *nasi tortio*, "twisting of the nose," referring to their pungency) is the classical name for cress applied by Linnæus to the genus of Cruciferae, of which the water-cress (*N. officinale*) is the best known. In the 16th century, when properties were more considered in the classification of plants than structure, the species of the widely different, but pungent, genus *Tropaeolum*, on their introduction from America, were termed "Indian cresses" or *Nasturtium indicum*, and have ever since retained the name Nasturtium.

Natal, a British colony in South-east Africa, bounded on the N. by the Transvaal, on the W. by the Drakensberg mountains, on the S.W. by Griqualand East, and on the S. and E. by the Indian Ocean. The parallel of 30° E., and meridian of 30° S., cross about 60 miles W. of Durban. Natal has an area of 35,370 square miles, and a coast line of 376 miles. Its population is estimated at 1,108,754, of whom four-fifths are Zulu-Kaffirs, while 100,000 are Indian and Malay coolies and 100,000 Europeans. From the sea the land gradually rises to the Drakensberg, some of the peaks of which exceed 10,000 feet in height. Of the numerous rivers, which are all unnavigable, the most important are the Umvolosi, Umhlatuze, Tugela, Buffalo, Mooi, and Umkomazi. The climate is healthy, neither summer nor winter being oppressive, and the average annual rainfall is 40 inches. In the fertile coast region, sugar, tea, coffee, tobacco, and other tropical plants grow well, while in the middle uplands grain crops are cultivated, the higher plateaus being eminently suited for cattle pasturage, and sheep grazing. Ostrich farming is also a noticeable industry. Coal is by far the most valuable mineral, but copper, iron, gold and other minerals occur. Wool is a staple export. The colony is well equipped with railways. Durban, or Port Natal, 800 miles N.E. of Capetown, is the only harbour of any consequence, and Pietermaritzburg, 54 miles N.W. of Durban, is the capital. Natal was so named from the fact that it was discovered by Vasco da Gama on Christmas Day, 1497. Attempts to colonise the country by the Portuguese and Dutch were unsuccessful, and it was not till 1824, in the time of the warlike Chaka, the Zulu King, that a white settlement on a small scale was effected. The Zulus afterwards quarrelled among themselves, one party following Dingaan, and another Panda. The Boers making common cause with the latter, Dingaan was defeated and killed, and the Boers afterwards set up the Republic of Natalia. In 1843, however, the territory was proclaimed to be British, and a year later was formally annexed to Cape Colony. In 1856 it was created a separate colony, and in 1893 acquired responsible government, under its own Governor and Legislative Assembly. During the Zulu war (1878-9) some of the fighting took place in Natal and the adjacent Zululand (since incorporated), the more memorable incidents being the British disaster at Isandhlwana, the glorious defence of Rorke's Drift, and the crushing Zulu defeat at Ulundi. In the first Boer war (1881) the Boers invaded Natal, and before peace was declared, won signal successes at Laing's Nek and Majuba. Still more widespread was the fighting in the second Boer war, especially at Dundee, Elandsagte, Nicholson's Nek, Colenso, and Spion Kop, while the siege of Ladysmith, which endured from November 2nd, 1899, to February 28th, 1900, attracted universal attention. The colony was cleared of Boers in June, 1900, and after the war was ended, received a considerable access of territory on its northern frontiers from what had been the South African Republic. In 1905-6 the Zulus grew restless under the imposition

of a poll-tax, and skirmishes, with fatal results in some cases, occurred between native forces and the colonial troops. In March, 1906, twelve natives, concerned in a murderous attack on the police, were tried by court-martial, and sentenced to be shot. When the Imperial Government suspended the sentence pending inquiries, the Natal Ministry at once resigned. Explanations, however, having been tendered, the capital sentence was carried out on April 2nd, and the resignation was withdrawn.

Natatores (Swimmers), in some classifications, an order of birds, containing those which are partially or entirely web-footed. There are four groups or families: (1) Auks, Penguins, Guillemots, Divers, Grebes; (2) Gulls, Terns, and Petrels; (3) Pelicans, Cormorants, Gannets, Frigate-birds, Tropic-birds, and Darters; (4) Ducks, Geese, and Flamingoes.

Natchez, a renowned North American nation, formerly powerful in the lower Mississippi basin above the Delta, where is now the city of Natchez. Saving a few who may be living with the Creeks in Indian Territory, or in the Cherokee Hills, the race is practically extinct. It comprised the two divisions—Nah'tehi and Taensa. Most of the Natchez were destroyed by the French in 1730, when the survivors took refuge amongst the Chickasaws and Upper Creeks. The Natchez was a stock language fundamentally distinct from all others; but much doubt prevails regarding the affinities of the Taensa, the grammar of which, with vocabulary and Texts, published by J. D. Hamonté in 1882, is believed, on internal evidence, to be a fraud. (D. G. Brinton, *American Antiquarian*, March, 1885, pp. 109-14.)

National Debt, the sum which the government of a country has borrowed for public purposes, and the interest on which is paid by means of taxation. From an early period sovereigns have had recourse to loans as a means of meeting current expenses, but they were always required to give some security; in the Middle Ages, for example, they frequently pawned the crown jewels. In these circumstances public debts were neither very large in themselves nor did they accumulate to any considerable degree. In England it was the desirability of having a fixed centre of wealth on which to draw for public purposes that led to the formation of the Bank of England in 1694. As regards the origin of national debts, it may be stated broadly that war has always caused the chief drain on the resources of a country. In Great Britain, for instance, £600,000,000 was added to the national debt during the wars with Napoleon. With reference to the character of public debts, it is to be remarked that they differ in some particulars from those of private individuals. The claim of a citizen who has debts owing to him from a foreign government upon the protection of the State is generally recognised, and the discharge of obligations undertaken in connection with them is sometimes enforced by means of active hostilities, as in the intervention of France and other European

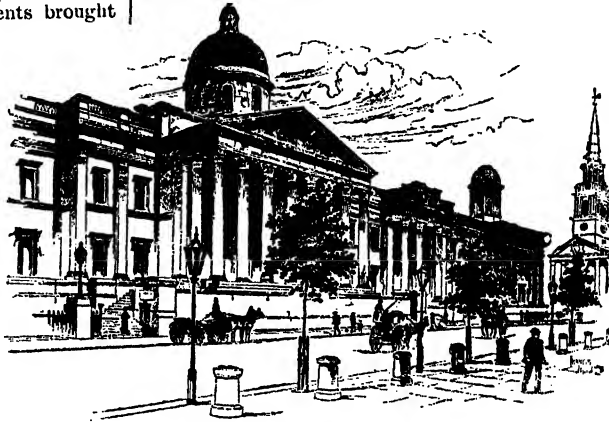
powers in Mexico in 1861. It is a generally admitted principle that debts should be repaid in the present value of the national currency, since the probability of a rise or fall in the value of stock was a consideration which decided the original terms of the loan. The advisability of paying off the national debt is a question regarding which very diverse views have been held by economists and statesmen. Amongst the arguments brought forward against repayment, it is maintained that the national wealth is not diminished by the transfer of a certain portion from one class of the community to another which the payment of the interest involves; that the existence of the debt prevents capital from being sent abroad; and that, even if repayment is desirable, it should be postponed till a further increase in the resources of the country lessens the strain which the operation would cause. These and other contentions are either radically unsound, or their cogency is very much modified by other considerations, and most economists now hold that the extinction of the debt is desirable if it can be effected without having recourse to burdensome and injurious taxation. The national debt of Great Britain, which was £243,063,145 in 1784, was reduced from £861,039,019 in 1815 to £756,332,190 in 1905. The following were the debts of some of the chief European countries and British colonies in 1904:—

France	.. ..	£1,235,370,969
German Empire	.. ..	157,782,000
Prussia	.. ..	352,861,140
Austria	.. ..	156,724,085
Italy	.. ..	508,689,525
Russia	.. ..	508,000,000
Turkey	.. ..	140,000,000
India	.. ..	214,410,000
Canada	.. ..	255,285,671
New South Wales	.. ..	82,321,998
New Zealand	.. ..	59,012,000

In 1904 the total debt of the United States was £574,644,267, of which £329,048,533 was covered by cash and reserve in the Treasury.

National Gallery, London, is the most important public collection of pictures in Great Britain and contains many valuable examples both of the old and modern masters. The nucleus of the collection was the purchase, in 1824, of the pictures belonging to John Julius Angerstein (1735-1823) for £60,000, and these have since been added to from time to time, rather through private munificence than the patronage of the State. The national exchequer was drawn upon, however, for the purchase of Raphael's "Madonna del Ansdei" (£70,000), and Van Dyck's equestrian portrait of Charles I. (£30,000). The *Bokeby Venus* by Velasquez was presented to the nation by a private committee, which had acquired the picture (1906) for £45,000. The building in Trafalgar

Square was begun in 1832 and opened in 1838. It was designed, at a cost of £70,000, by William Wilkins, R.A. (1778-1839), and though, considering the magnificent site, its elevation is poor and mean, the architect was greatly hampered by the conditions laid down by Government. The Royal Academy occupied part of it from 1838 to 1868.



THE NATIONAL GALLERY, LONDON.

National Guard. The French National Guard was organised in the first year of the Revolution (July, 1789). It was intended primarily for the defence of the capital, and was placed under the control not of the Crown, but of the municipality of Paris. Bodies of this kind already existed in some of the provincial towns. The Paris guard numbered 48,000 citizens at the outset, and soon afterwards the total number engaged in the defence of the kingdom was nearly 300,000. The National Guard was finally abolished in 1870.

National Hymns. With one or two possible exceptions, the familiar national hymns belong to the 18th and 19th centuries, and most of them were inspired by circumstances that made unusual appeal to fervent patriotism. The words and music of "God save the King," the British Anthem, were first rendered at a dinner in 1740 to celebrate the capture of Portobello in South America by Admiral Vernon. They are generally ascribed to Henry Carey (1690-1743), author of "Sally in our Alley," though Mr. W. H. Cummings claims the air at least for Dr. John Bull (1562-1628), organist of the Chapel Royal, whose name at any rate was appropriate. The air, adapted to words by Heinrich Harries, a Holstein clergyman—"Heil dir im Siegeskranz" ("Hail to thee, laurel-crowned victor")—for the birthday of Christian VII. of Denmark in 1790, became the Prussian national hymn. The Danish national hymn, "Kong Christian stod ved højen mast" ("King Christian stood by the lofty mast"), first appeared in the opera of *Die Fischer*, by Johann Ernst Hartmann (1726-1791). The original words of the Emperor's hymn, the

Austrian national anthem, were written in 1796 by Lorenz Leopold Haushka, set to music by the illustrious Haydn, and performed on Francis's birthday, February 12th, 1797. The words now associated with Haydn's music—"Gott erhalte Franz den Kaiser" ("God save Kaiser Francis")—were written by Baron Zedlitz. The Magyar hymn was composed by Franz Erkel in 1845, in answer to a prize for the best composition of the kind. The Russian national hymn, "God save the Tsar," was composed in 1833 by Alexis Feodorovich Lvoff. Probably "Die Wacht am Rhein" ("The Watch on the Rhine"), which attained to enormous popularity during the Franco-German War of 1870-1, may be accepted as the German Anthem. The words were written in 1840, by a manufacturer named Max Schneckenburger, the air was composed by Carl Wilhelm and the song was first sung in 1854. "La Brabançonne," the Belgian national hymn, arose out of the exciting times of the revolution of 1830, the tune being composed by Campenhout and the words by Jenneval. The Italians have had a choice of several airs composed during the national crises of 1821, 1848, and 1859. Perhaps the most popular are "Daghele avanti un passo" ("Move a step forward"), composed at first as a ballet song by Paolo Giorza in 1858, and Garibaldi's hymn, which is probably the most favoured. "La Marseillaise," the soul-stirring song of the French people, was composed and written in 1792 by Rouget de Lisle. The origin of "Yankee Doodle"—which despite all efforts to dethrone it, in favour of "Hail, Columbia," and "The Star-spangled Banner," remains the national hymn of the United States—is wrapped in mystery, but the general opinion is that it belongs to the time of the Colonists' warfare with the French and Indians about 1755. "Rule, Britannia," the words of which were written by James Thomson, the poet of *The Seasons*, the music being composed by Dr. Arne, was held by Southey to be the "political hymn" of Great Britain, while Wagner said of it that the first eight notes contained the whole character of the English people. The Irish national hymn is "The Wearing of the Green"; that of the Welsh, "The March of the Men of Harlech," and that of the Scots, Burns's song of "Scots, wha hae," the air of which ("Hey tutti tutti") is traditionally said to have been sung at Bannockburn (1314). "Auld Lang Syne" is not so much a national as a world hymn.

National Lifeboat Institution. THE ROYAL, founded in 1824, is an association for the providing and maintaining of lifeboats and life-saving appliances on the coasts of Great Britain and Ireland, and for rewarding gallant services in connection with the saving of life at sea. At December 31st, 1905, it wholly maintained 282 boats (including 194 self-righting boats and a motor-boat), and since its formation up to the date mentioned, had been instrumental in saving no fewer than 45,439 lives. The magnitude of its operations will be gathered from the fact that it needs £100,000 yearly in order to maintain its vast fleet, and that this income has to be derived almost entirely from voluntary contributions. A sum of

£3,000 is sufficient to provide and endow one of the most modern boats.

National Portrait Gallery. London, was founded in 1856 and first housed in rooms in Great George Street, Westminster, the collection being opened to public view in 1859. Ten years later, the pictures were removed to the provisional buildings at South Kensington, facetiously known as the "Brompton boilers," where they remained until 1885, when they were transferred to Bethnal Green Museum for a limited period. In 1889 Mr. W. H. Alexander, of Shipton, Andover, having offered to build a gallery if Government provided the site, the present structure at the back of the National Gallery was completed in 1895 at a cost of £96,000, towards which Mr. Alexander contributed £80,000, and opened in the following year.

Nations, Law of, or INTERNATIONAL LAW, is, as a science, a creation of modern times. It is a term used to denote certain rules of conduct generally adopted, either by tacit consent or by actual agreement, amongst the civilised nations of the world with regard to their rights and duties towards each other. In a word, international law prescribes as between nation and nation rules of conduct, much as the civil law of a country prescribes rules of conduct as between individuals. The law of nations, so-called, is not really law in the same sense that the law of England is law; because law, properly so-called, must be capable of enforcement—it presupposes the superior (State), who commands, and the inferior (subject), whom the superior can easily coerce into obedience or punish for disobedience.

In international law there is no tribunal with the power to enforce its decrees. Thus the law of nations is dependent on the moral force behind it—on public opinion—on the fact that a State which outrages the canons of conduct universally accepted as just and proper, and fair and right, will encounter the ill-will of other States. And ill-will between States easily leads to acts of hostility; either a war of arms or a war of trade. So that, although the law of nations cannot be enforced as the law of England or the law of France can be enforced, it is not therefore a light matter to break it.

The source of international law is, then, chiefly custom. There are some customs or usages observed between nations so old and of such universal application that nobody can possibly trace their origin. The best known of these is the inviolability of ambassadors. There has never been a tribe or a people who have not recognised as morally binding the duty of respecting the persons and property of the ambassadors of foreign States. Upon this foundation, which appears to have originated in a universal acknowledgment of the impossibility of international relations unless ambassadors were so tolerated, has arisen the whole superstructure of extra-territoriality. This theory (and practice) is now universal; and it is that an ambassador is not subject to the law of the State where he temporarily resides; that his house, with

its curtilage, is outside the country where the ambassador is actually living, and forms part of the country from which the ambassador has been sent. Thus the German ambassador's house in London is, in theory of international law, a part of Germany. Those who dwell therein are, in the eye of the law, living in Germany; and, as a consequence, the courts of his Majesty have no jurisdiction over those persons.

The foundations of the science of the law of nations were laid by the celebrated Grotius, a Dutchman, who published in 1624 an epoch-making book entitled *De Jure Belli et Pacis* ("Concerning the Law of War and Peace"). Grotius tried to apply to international dealings some common rule of conduct; and he found that common rule in the Roman law. In the State of Rome, from very early times, there were two kinds of law running side by side, the *Jus Civile*, or law applicable to Roman citizens only; and the *Jus Gentium*, or law of nations (more accurately the "law of foreigners"), applicable to all cases where disputes arose between persons dwelling in Rome who were not Romans. For instance, if a dispute arose between two denizens of the city, one a Jew and the other a Greek; or even one a Greek and the other a Roman citizen, the *Jus Civile* could not be applied, because it was bound up with religious rites and observances which it would have been sacrilege to apply to an alien. The Roman judges therefore invented, from time to time, law based on reason to deal with these cases. This was the *Jus Gentium*, which Grotius took as the foundation of his work.

Since the days of the great jurist, his work has been carried on from time to time by jurists in all civilised countries. These men have been consulted by Governments on questions of international right; and their opinions have had due weight in forming international usages and in the making of treaties declaratory of international duties, rights, and obligations.

The theory of the law of nations begins by recognising States—*independent sovereign States*—as its only clients. A difficulty sometimes arises as to whether a State is an independent sovereign State for international purposes—for instance, as in the case of the Transvaal Republic, which had recognised the suzerainty of Great Britain. Again, when part of an existing State rebels, it is always a question of extreme delicacy to say when the rebels, if they are not speedily quelled, become an independent State. There were jurists who, during the American Civil War, advised European Governments to recognise the Confederate States as an independent nation—the Federals, of course, called the Confederates "rebels."

Formerly it was thought that a foreign State might lawfully interfere between a rebellious people and their sovereign. This is now discredited. Again, it was formerly held justifiable for a foreign monarch to interfere when it was proposed to alter the succession to the throne; to which throne he or his family might, at some future time, succeed if the succession were not altered. All these doctrines are now discredited.

Every nation is, in international law, entitled to work out its internal problems of government in its own way without outside interference. At the same time, it is legitimate for a foreign Government to interfere to prevent a state of anarchy in a country where the foreign Government or its subjects have large interests, and where the home Government cannot protect life and property. This was the justification for British interference in Egypt in 1881, and for European interference with Turkey in 1827.

Amongst the rules of the law of nations, taken almost directly from the Roman law, is the rule as to the right to territory. Territory is acquired by (1) Occupation of land not already occupied. Mere discovery is nothing without occupation. And occupation must be effective. That is, the State in question must really do something which amounts to asserting a right of ownership (*e.g.* hoisting a flag), and follow this up by exercising actual sovereign rights. To hoist a flag, sail away, and not go near the new territory again, would not be effective occupation. (2) Prescription, or the occupation, without formal act, of territory for a long period. No specific time has ever been determined. (3) Gift, purchase, exchange, or treaty—and it is not necessary for the inhabitants of the ceded territory to give any consent; though in the case of civilised peoples the trend of modern opinion is in favour of giving them a voice in the matter. (4) Conquest in war. A State is said to be conquered when its own Government is unable to exercise the functions of government over the country as a whole.

A modern rule as to the limits of a nation's territory is that the country's rights extend to all its shores, over all the mouths of rivers, estuaries and bays, and for a distance of one marine league from low-water mark. All the sea beyond this is common to all the world. In the 16th and 17th centuries England laid claim to the Narrow Seas that wash its shores (North Sea, English Channel and St. George's Channel and Irish Sea); and Spain to the whole Pacific Ocean. But Grotius disposed of the English claim; and the guns of Drake and Hawkins made light of the pretensions of Spain.

As to intercourse between nations, ambassadors have the privilege of *ex-territoriality* (*see above*); and this right has been extended to all Government ships in foreign waters. Thus, a French ship-of-war anchored in the Thames is still a part of France. Treaties between nations are contracts, interpreted as far as may be by the ordinary rules of the interpretation of contracts. There is an increasing tendency, in modern times, to submit to arbitration questions involving the interpretation of treaties. Under the same head of intercourse, international law has certain well-known rules as to the duties of a Government towards foreigners within its bounds. They must not be denied ordinary justice. If they are, their own Government has the right to complain; and if the complaint is not met fairly, diplomatic relations may be suspended, or reprisals may be made, or even war may be declared.

Reprisals is a term used to express acts of a retributive or punitive character which fall short of actual war. Thus, if a British subject were treated with great injustice and despoiled with the connivance of the courts in (say) Turkey, the British Government might, as a reprisal, seize all Turkish shipping in British ports, and retain it until justice were done or compensation made.

War is the ultimate remedy of a State against another wrongdoing State; and the aim of international law has always been to make it as humane as possible, consistent with the object of war—namely, to cripple the enemy and make him sue for peace.

The Geneva Convention of 1864, for ameliorating the conditions of soldiers wounded on the field of battle, was drawn up by plenipotentiaries from eleven countries (not including Great Britain, Russia, or the United States), and has now been adopted by all civilised Powers. By it, ambulances and military hospitals are to be neutral, so long as they are not held by a military force; persons employed therein are neutral also, and exempt from capture; inhabitants of the country are to be encouraged to assist wounded soldiers; wounded and sick soldiers falling into the enemy's hands are to be entertained and taken care of, and may be returned on condition of not bearing arms again in the war; a flag of a red cross on a white ground is to be flown by hospitals and ambulances, and a similar arm-badge worn by doctors, attendants, etc.

The Declaration of St. Petersburg, 1868, is the next international attempt to humanise by agreement the usages of war. The delegates of Great Britain, Austria-Hungary, France, Prussia, Russia, Turkey, Italy, and practically all the other sovereign States of Europe, except Spain, agreed to declare: That the calamities of war ought to be alleviated as much as possible; That the only legitimate object in war is to weaken the forces of the enemy; That the disabling of the enemy is alone legitimate; That it is illegitimate to employ arms that would cause needless suffering or inevitable death; And that, therefore, the contracting parties renounce the use of any projectile of a less weight than 400 grammes (about 14 oz.) which is either explosive or charged with fulminating or inflammable substances.

A still more important event in the progress of international law was The Hague Conference, 1899, taken part in not only by all the sovereign States of Europe and the United States of America, but also by Mexico, Japan, China, and Siam. In addition to the attempt to set up a tribunal for international arbitration, the Conference, composed of great jurists, compiled something like a code of the laws of war. This authoritative code is a great improvement on the former nebulous condition of things, when, practically, every nation had its own standard.

Belligerents, entitled to be acknowledged as such, were defined to be armies, militia and volunteers, commanded by a responsible person, having a fixed distinctive emblem (uniform or badge) recognisable at a distance, carrying arms openly, conducting their operations in accordance

with the laws of war. But to meet such a case as that of the French after the *débâcle* at Sedan, and the Boers in the invasion of the Transvaal, it was declared that when the population of a territory *which has not been occupied*, on the enemy's approach, spontaneously take up arms without having time to organise or acquire a uniform, etc., they shall be entitled to be respected as belligerents, so long as they respect the laws and customs of war.

Prisoners are in the power of the hostile Government; not of the capturing army. They must be humanely treated; and all their personal property, except arms, horses, and military papers, remains their property. This is an attempt to put a stop to pillaging prisoners—a very ancient practice. You may confine prisoners within the bounds of a town, or other locality, and fix limits beyond which they must not go; but you may not imprison them, except as indispensable means of safety. Such prisoners, also, may be set to employment; but no excessive tasks are to be imposed, nor may they be employed in services for the war. For example, a prisoner might not be set to dig trenches for fortifications. All such work must be paid for, and the wages must go towards (a) maintenance, (b) improving the position of the prisoners, and (c) the balance handed over at the end of the war. Prisoners of war may not be given worse food, clothing, and lodging than the troops of the Government that holds them.

Prisoners may be released on parole, and their own honour, and the honour of their own Government, is concerned that the parole is scrupulously kept. But a prisoner is not bound to accept release on parole—he may prefer the chance of escape. A prisoner who has broken parole, on being recaptured, is liable to be court-martialled and treated as a criminal.

Individuals who follow an army by permission in writing of the general are entitled to be treated as prisoners of war (e.g. newspaper correspondents). Facilities are to be given to societies for the relief of prisoners of war; and gifts and relief for such prisoners are to be admitted duty free, and carried free on all Government railways. The capturing Government may allow captured officers their full pay; and the officers' Government is bound to repay the amount at the end of the war. Prisoners are to be allowed every latitude in the exercise of their religion; and, to relieve the minds of relatives at home, an information bureau must be established.

As to the actual conduct of hostilities, the St. Petersburg Convention is left far behind. "The right of belligerents to adopt means of injuring the enemy is not unlimited." It is prohibited to employ poison or poisoned arms; to kill or wound by treachery; to kill or wound an enemy who has laid down his arms or has surrendered at discretion (e.g. as Henry V. did after the battle of Agincourt); to declare that no quarter will be given; to employ weapons, etc., which cause superfluous injury, and especially to employ flattening or expanding bullets; to make improper use of a

flag of truce, the Geneva flag or badge, the national flag, military ensigns, or the enemy's uniform; to destroy or seize any enemy's property unless imperatively demanded by the necessities of war (*e.g.* as Napoleon did when he carried off the art treasures of Italy and the sword of Frederick the Great). It is also prohibited to attack or bombard undefended towns, villages, or buildings, and to pillage a place even when taken by assault. (By immemorial usage, it had been considered lawful to deliver up to pillage a town taken by assault.) In sieges and bombardments, care must be taken to spare buildings devoted to religion, art, science, and charity, also hospitals; provided these places are indicated by some mark previously notified. Except in case of an assault, notice must be given before bombarding a town.

One of the most interesting parts of the Convention is that relating to spies. Spies are defined to be individuals acting clandestinely or on false pretences, and seeking to obtain information within the zone of operations of a belligerent. Thus, soldiers not in disguise can never be spies. Nor can soldiers or civilians carrying despatches openly—that is, merely seeking to get from one part of their own army to another, though in doing it they enter the enemy's lines. And even a spy taken in the act can only be punished after a trial. If a spy regains his own army, he cannot be treated as a spy if he is captured afterwards when he is not spying. A man who uses a flag of truce (which must be white) to obtain information is liable to be detained and punished; otherwise the bearer of a flag of truce is inviolable.

With regard to the occupation of territory by a hostile army, a series of rules grafted on those previously in general use was drawn up. The army of occupation must preserve public order and safety. It may collect the taxes, but out of them must defray the expenses of administration. Punishment of whole communities by fines on account of individual acts is prohibited; and so is the impressment of the inhabitants into the service of the invader. Contributions in kind may not be made without payment, nor may private property be confiscated. The occupying State may use, and take the produce of, but must not impair or destroy, the public buildings, real property, forests, and agricultural works of the hostile State.

In naval warfare, the rule as to destruction and confiscation of public and private property differs materially from the land rule. So far from the private property of an enemy being left alone by immemorial and firmly-established usage, all ships of an enemy, public or private, found on the high seas may be sunk or captured. [As to the goods and ships of neutrals, see *NEUTRALITY*.] At one time private ships used to be commissioned by naval States to roam the high seas and search for, destroy, and capture the ships and goods of the enemy. The Treaty of Paris of 1856, assented to by Great Britain, declares that "Privateering is and remains abolished." The United States alone declines to join this declaration; and it remains to be seen whether a privateer would in any future war be treated as a pirate.

Pirates are outside international law. They may be captured and shot or hanged by their captors, no matter to what nation they belong.

The Peace Conference at The Hague not only drew up the code of rules for war, but also attempted to do something in the direction of preventing war by establishing a tribunal for International Arbitration. Ever since 1815, numerous disputes, more or less serious, have been settled by arbitration, instead of by war. Of these, the most celebrated are the Venezuelan Boundaries dispute (Great Britain and Venezuela), the Bering Sea Fisheries dispute (Great Britain and the United States), the *Alabama* case (Great Britain and the United States), the Pendjeh Boundary dispute (Great Britain, Russia, and Afghanistan), the Fugitive Slaves dispute (Great Britain and the United States), and the Dogger Bank Outrage dispute (Great Britain and Russia). The last-named would, in the middle of the 19th century, have led certainly to war.

The Hague Conference, at the instance of Sir Julian (afterwards Lord) Pauncefote, agreed that four jurists should be appointed for each country, to constitute a tribunal sitting permanently, with offices at The Hague. Whenever any dispute arose and seemed likely to be serious, either country could appeal to the tribunal, or any third party could recommend them to do so. Arbitrations are to be by four permanent arbitrators (two appointed by each disputant) and a fifth to be appointed by a neutral Power agreed on in common. A set of rules was drawn up regulating procedure.

It should be said that international jurists agree that questions of "territory" and "national honour" are outside the scope of arbitration and can only be settled by war. But the experience of Great Britain and the United States goes to prove this to be fallacious; and it is possible that another half-century may see enormous strides made in the direction of international arbitration as a substitute for legalised homicide.

Native Rabbit (*Peromyscus lagotis*), the Rabbit-Bandicoot, from West Australia, sometimes made the type of a genus, *Macrotis*.

Natron, a carbonate of soda which occurs as a mineral deposit in various localities in Egypt, Siberia, Mexico, and other parts. It is also known under the names of *Trona* and *Urao*.

Natural History, as the words imply, is concerned in its widest sense with all the concrete sciences, but has gradually become limited to the life and habits of animals. By the necessity of the case, the classical writers—of whom the most eminent were Aristotle (384-322 B.C.) among the Greeks and Pliny the Elder (A.D. 23-79) among the Romans—contributed little of permanent value to this branch of knowledge. Indeed it was not till the time of Linnaeus (1707-1778), whose *Systema Naturæ* was epoch-making, that ordered research on an intelligible plan was possible. The other great moderns were Buffon (1707-1788), whose *Histoire Naturelle* appeared between 1749 and 1804, and Cuvier (1769-1832), whose *Règne Animal* was

published in 1817. The later researches of Darwin, A. R. Wallace, Milne-Edwards, Huxley and many others enabled the subject to be treated almost with the precision of an exact science. Among popular treatises are, in German, the elaborate *Thierleben* of A. E. Brehms (1829-1884), and, in English, *Cassell's Natural History* and the works by J. G. Wood, R. Lydekker, R. Bowdler Sharpe and Dr. Robert Brown.

Naturalisation, the act or process whereby an alien may acquire the rights of a natural subject or citizen. In Great Britain naturalisation can be effected either by Act of Parliament or in terms of the Naturalisation Act of 1870. According to the first method, an alien is put in exactly the same state as if he had been born in the kingdom. It has therefore a retrospective effect, in which it differs from mere denization; and, consequently, if a man were naturalised by Act of Parliament, his son born before might inherit land in the realm. By a statute passed in 1844 naturalisation might be effected by certificate of a Secretary of State. This Act was passed to enable foreigners coming to reside and settle in the United Kingdom to obtain the advantages of naturalisation in a less expensive and less tedious way than by procuring a private Act. This statute was repealed in favour of the Act of 1870, under which an alien who has resided in the United Kingdom (or has been in the service of the Crown) for not less than five years, and intends when naturalised either to reside in the United Kingdom or to serve under the Crown, is enabled to apply for a certificate of naturalisation to one of the Secretaries of State, who may, after receiving the necessary evidence in support of the application, issue a certificate, whereupon, and upon his taking the oath of allegiance, the alien shall, in the United Kingdom, be entitled to all political and other rights, powers, and privileges, and be liable to all the obligations to which a natural-born British citizen is entitled or subject in the United Kingdom.

Natural Philosophy is a science which, in its evident sense, includes all scientific knowledge which is based upon natural law. A mere record of phenomena, however interesting, would not be included in natural philosophy; but directly an explanation of these phenomena can be given, directly we can measure the effects of any given cause, then their study rises to the level of philosophy. It is usual to limit the term natural philosophy to that branch of science which deals with the behaviour of bodies when they do not undergo any change in themselves. Chemistry and botany are hence excluded, while astronomy, although really a branch of natural philosophy, has become so vast a subject that it, too, is excluded and left to form a separate science. Natural philosophy is thus limited to the various branches of physics.

Natural Selection. [DARWINISM.]

Nature-Worship, a form of religion in which physical phenomena are worshipped as gods, or as the representatives of gods. Nature-worship reached

its highest development in classic times, but prevails, in some cases in an elaborate form and in others on a rudimentary scale, among all uncivilised races.

Naucratis, an ancient city of Egypt, in the Nile Delta. The site, 47 miles S.E. of Alexandria, is now close to the village of Nebreh. It was discovered in 1884 by Professor Flinders Petrie, who, in his *Naucratis* (1886), gave an account of the ruined temples and other remains which had been excavated. The Greeks were allowed to trade here, and the city was a centre of the worship of Aphrodite. Some good pottery has been found.

Naumachia (Greek "sea-fight"), in ancient Rome, was a public spectacle, consisting of the representation of a naval battle, in which gladiators fought as they did in the amphitheatre. The first naumachia took place on a sheet of water in the Campus Martius, made for the purpose by Julius Caesar (46 B.C.).

Naumburg, a town of Prussian Saxony, Germany, 18 miles S.W. of Merseburg. It is prettily situated among the hills in the valley of the Saale, and is surrounded by gardens and vineyards. The principal buildings are the Protestant cathedral, rich in specimens of old German art, the Roman Catholic cathedral, the castle (now used as public offices), and the town-hall. The chief manufactures are of carriages, combs, cards, cloth, hosiery, leather, and a trade is carried on in wine and wood. Pop. (1900), 23,187.

Nauplia, a seaport of the Morea, Greece, near the head of the Gulf of Nauplia, 5 miles S.E. of Argos. The town was of some consideration in the Middle Ages, and preserves several relics of the rule of the Venetians, by whom it was called Napoli di Romania. The fortifications are extensive, and on the steep hill of the Palamidi stands the convict prison of the kingdom. From 1822, the date of the struggle for independence, to 1834, Nauplia was the seat of government, but when Athens became the capital, the town suffered both in importance and population. A brisk shipping trade, however, is still carried on. Pop. 6,000.

Nauplius, the name of one of the principal larval forms of Crustacea. Unlike the adults, the body of the larva is not divided into a series of divisions or segments; it has, moreover, only three pairs of appendages, which correspond to the two pairs of feelers or antennæ and the mandibles or jaws. Another difference from the adult is the possession of only a single eye in the middle line of the head instead of a pair placed one on either side. The name was given to this larva under the impression that it was a distinct animal, before its life-history was discovered. This form of larva is typical of the sub-division of the Crustacea known as the Entomostraca; it occurs, however, in two members of the other group—the Malacostraca, viz. the genera *Euphausia* and *Pennæus*, while in a third genus, *Lucifer*, there is an allied form known as the Meta-Nauplius, which differs from

the nauplius by the presence of two additional pairs of limbs.

Nausea, the term applied to the feeling of discomfort which precedes actual vomiting.

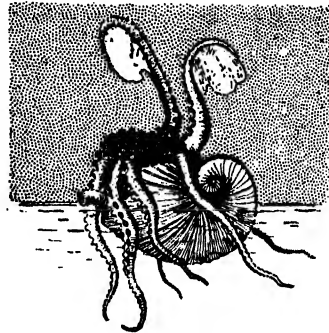
Nautch Girls, professional dancers in India. Their performances constitute the chief part of an entertainment called a Nautch, without which no festival is complete. A French traveller describes it as a "beatified drowsiness," the women moving slowly in wondrous draperies to the endless tinkling of a guitar. The nautch girl is a professional entertainer and prostitute. She alone of the women of India receives any education, learning to sing lewd songs and to read from early childhood. Her calling involves no reproach, but is rather held in honour. Treated by all castes with deference, more respect is shown to her than to married women, and she only moves freely in the society of men who, in their home-life, are jealous of the honour of their women. Having an exalted place in the religious and social life of the Hindus, she it is who fastens the necklace round the bride's neck, an act answering to the placing of the ring on a bride's finger in Christian marriage. Girls' schools have been provided for those who have the courage to throw off their caste, and Christian girls are educated, but their numbers are insignificant compared with the teeming population of India.

Nautical Almanac, an almanac issued by the authority of the Board of Admiralty, under the direction of the "Nautical Almanac Office." It contains lists of the astronomical phenomena of the year, and the elements requisite for finding the longitude at sea. It first appeared in 1767 under the editorship of Dr. Maskelyne, then Astronomer-Royal, who superintended its preparation for forty-five years. The equivalent French publication, *La Connaissance des Temps*, was begun by the Abbé Picard in 1679 and is issued under the authority of the Bureau des Longitudes. The *Berliner Astronomisches Jahrbuch* (1776) and the *American Nautical Almanac* (1855) are the similar official publications in Germany and the United States.

Nautiloidea, the sub-order of Tetrabranchiate Cephalopoda, of which Nautilus is the typical and only living member. It differs from the other sub-order Ammonoidea in that the sutures or lines that mark the division of the separate body-chambers are usually simpler and less folded than in the latter group; the siphuncle, moreover, passes through the centre of the septa and is protected by a back growth from this, forming a collar. In addition to the living Nautilus, the order includes a large number of extinct forms, dating from the Upper Cambrian period.

Nautilus, the one living genus of Cephalopoda belonging to the sub-class Tetrabranchiata, and the type of the order Nautiloidea. The animal is included in a strong coiled shell composed of many different chambers; these are cut off from one another by transverse calcareous plates, or septa, which are curved and have the convex surface

directed forwards. The traces of these septa on the external wall of the shell are gently wavy or straight, and not complicated by a great series of foldings as in the Ammonites. The septa are perforated in the centre by a membranous tube known as the siphuncle, which is protected as it passes through the septa by a number of backwardly-directed calcareous processes known as the collars. Though the shells of the Nautilus are extremely common, the animal is rare. Its anatomy is of great interest, as the genus is the only known living member of the order. The body is internal, and occupies only the last body-chamber of the shell. It differs from all the other living Cephalopods [CUTTLEFISH] by the absence of an ink-bag, of auricles to the heart, and of the expansions at the base of the gills known as "branchial hearts." The foot is divided into lobes arranged around the



NAUTILUS.

mouth; each of these lobes corresponds to one of the arms of the Octopus; the suckers on the arms of other Cephalopods are here represented by a series of tentacles, of which there are over sixty. The funnel, by the ejection of water from which the animal can swim backwards, consists only of a loose slit, and not a closed jet, as in the other Cephalopoda. The eyes are extremely simple and consist only of a pair of simple pits. There are two pairs of gills (whence the name Tetrabranchiata). As there are also two pairs of nephridia, it is thought that this may indicate a trace of ancestral segmentation. The genus is marine and occurs widely distributed throughout tropical seas. As at present defined, it dates only from the Liassic period.

Nauvoo, a city of Hancock county, Illinois, United States, on the Mississippi, 14 miles above Keokuk. Founded in 1840 by the Mormons, the temple which they erected here is now a ruin. On their expulsion the town was occupied for a time by a number of French Socialists. Fruit-growing and agriculture are the chief industries. Pop. (1900), 1,321.

Naval Reserve, an auxiliary to the Royal Navy, between which and the Mercantile Marine it forms a connecting link, highly valuable in cases

of national emergency. In 1859 a Royal Commission on manning the Navy recommended the formation of this Reserve, and an Act was passed authorising the engagement of 30,000 men, who are liable to be called out by Royal Proclamation. The Naval Reserve now consists of four principal classes: 1. The Royal Fleet Reserve (established under the authority of Acts of 1900 and 1903). Class A—men who have served in the Navy five to twelve years, who join for one or more periods of five years. They do a week's training at a naval port each year and their retainer is sixpence a day. 2. The Royal Fleet Reserve. Class B—men who have served twenty-two years in the Navy. They remain in the Reserve till 55, do the same drill as Class A, but get no retainer other than their pension. On reaching the age of 50 they get an extra fivepence a day pension. 3. The Royal Naval Reserve. These include officers and men connected with the Mercantile Marine and seafaring life as fishermen, etc. They have to do three months' drill in one of H.M. ships in their first year and one month biennially thereafter. The officers get retainers only after serving twelve months in the Navy—£10 to £25 a year according to rank. The men's retainers run from £6 to £10 a year. The old arrangement of drill batteries round the British coasts is being abolished, and all training in future will have to be done in H.M. ships. 4. The Royal Naval Volunteer Reserve. These correspond to the Army Volunteers and get no pay. The *Buzzard*, stationed on the Thames Embankment, London, is the headquarters of one of the divisions of this force. The drill is in the evening, and the men sometimes offer for a week's training in a gunboat. All volunteer at times to go to sea for manœuvres, and all may be called out for war. The numbers of the Naval Reserve for 1906 were:—

R.F.R., Class A	...	...	...	8,250
" Class B	...	...	...	11,250
R.N.R.	...	...	...	28,850
R.N.V.R.	...	...	...	4,200

52,550

The total cost for 1906 was £426,000.

Navarino, or NEOKASTRO, the official PYLOS, a seaport on the south-western coast of the Morea, Greece. It was the scene of the famous naval battle of the Greek Independence. This encounter was led up to by the refusal of the Ottoman Government to accede to the demand of the Powers that an armistice should be granted to the Greek insurgents. A combined British, French and Russian force, under Sir Edward Codrington, enforced the demand on October 20th, 1827, by entering the Bay of Navarino where the Turco-Egyptian fleet lay at anchor and by destroying it, though not until the enemy had begun the action. Pop. 3,000.

Navarra, or NAVARRE, a Spanish province between Aragon, Old Castile, and Biscay, having France on the N., and containing 4,046 square miles. It is bounded by the western slopes of the Pyrenees, and many streams flow thence to join its

rivers, the Ebro and Bidassoa. The climate is temperate and healthy. Timber is grown on the uplands, while the lowlands produce wheat, maize, wine, oil, flax, and hemp. Iron, copper, and lead are found. The chief industries include the making of paper, leather, candles, chocolate, alcohol, and linens and woollens. The raising of live stock is a profitable pursuit, and thousands of acres are under vines, olives, and other fruits. It is one of the richest provinces in Spain. Pamplona is the capital. In the Roman period the country was peopled by a Celtic race, the Vascones, who gave their name to the Basques and Gascons. It offered a stubborn resistance to Arab conquest. For a time it formed an independent kingdom under its own counts, but was occasionally united to Aragon through marriage, and also, from the same cause, passed under French rule. In 1512 the Duke of Alba conquered the country, and since then it has formed part of Spain. When Henry of Navarre, son of Antoine de Bourbon and Jeanne d'Albret, ascended the French throne in 1589 as Henri IV., French Navarre was joined to France, and now constitutes the Basses-Pyrénées. The Basque language prevails in the north of Navarra. Pop. (1900), 307,669.

Navarro, MARY ANDERSON DE, actress, was born at Sacramento, California, United States, on July 28th, 1859. Her father, an Englishman, was killed in the Civil War, fighting on the Confederate side; her mother was of German extraction. Miss Anderson was educated at the Ursuline Convent and Presentation Academy in Louisville, Kentucky. She made her *début* at the age of sixteen in the character of Juliet, and almost immediately achieved the highest distinction. After several brilliant tours in the United States she appeared at the Lyceum Theatre, London, in a variety of Shakespearean parts, repeating her American triumphs, and especially creating a great sensation in W. S. Gilbert's *Comedy and Tragedy*. On her marriage, in 1889, with Antonio de Navarro, she definitely retired from the stage.

Navies. The navies of the principal maritime Powers, at March, 1905, were composed of ships (see Table), besides transports, yachts, storeships, harbour craft, surveying vessels, and hulks. The officers and men available for sea-service in the navies of the chief maritime Powers at the same period were; United Kingdom, 129,000, including 19,983 Royal Marines; France, 54,549; Russia, 69,200; Italy, 27,200; Germany, 40,842; United States, 38,482; Japan, 20,000. The estimated annual naval expenditure at the same period was: In the United Kingdom, £35,078,187; in France, £12,743,982; in Russia, £12,345,000; in Germany, £11,424,845; and in the United States, £19,564,632.

Navigation is the art of directing the course of a ship at sea and finding her position by observation of the heavenly bodies, the indications of the compass, calculation of distances traversed, and the use of charts. It is an art of great antiquity, but until the use of the compass became general it was necessarily pursued with difficulty and uncer-

tainty. The Phœnicians were the most successful and most adventurous of early navigators, and there is good reason to believe that long before the Christian era they or their pupils visited not only Britain, but also the eastern and western coasts of Africa as far as points lying considerably to the southward of the equator. Navigation is made the object of special study at naval colleges and many polytechnics and technical institutes, with a view to obtaining the certificates necessary to the practice of the art. The books dealing with the practical branch of the subject include Norie's *Epitome of Practical Navigation* (1806), Raper's *Practice of Navigation and Nautical Astronomy* (1843), and the modern works, Harbord's *Glossary of Navigation*, Morris's *Elementary Navigation*, Lecky's *Wrinkles in Navigation*, Martin's *Navigation and Nautical Astronomy*, and Jeans's *Nautical Astronomy and Navigation*. The works of

that of 1651, and completed the ruin of Dutch trade; but the legislation on these lines had also the effect of ultimately leading to the rebellion of the American colonies. After the United States had become an independent nation, American retaliation led to the war of 1812, upon the conclusion of which, by the Treaty of Ghent, discriminating duties were abolished. Thenceforward the legislation of two hundred and fifty years began to be slowly undone. The Reciprocity of Duties Act was passed in 1823; the Navigation Act was in 1826 repealed in favour of a much more liberal measure; and finally in 1854 even the coasting trade of Great Britain and Ireland was thrown open to all the world.

Navy, MERCHANT. At an early period of her history England possessed no other sea-going ships than those which belonged to her merchant-

NAVIES OF THE PRINCIPAL POWERS IN APRIL, 1910.		* Battleships.	Battleships Building or Ordered.	* Armoured Cruisers.	Armoured Cruisers Building or Ordered.	Protected Cruisers.	Protected Cruisers Building or Ordered.	Gunboats, S. outs, &c.	Gunboats, &c., Building or Ordered.	Destroyers.	Destroyers. Building or Ordered.	Torpedo Boats.	Torpedo Boats Building or Ordered.	Subma-ines.	Submarines Ordered.
(* All in service included, whereas Government returns omit those over 20 years old.)															
Great Britain	60	9	32	3	52	5	26	2	188	37	110	—	65		
France	25	8	13	2	40	—	14	—	65	22	217	2	58		
Russia	14	8	4	2	8	—	7	—	97	5	98	—	20		
Germany	35	8	10	2	31	5	—	—	93	24	47	—	8		
Italy	14	2	8	2	14	—	13	4	17	16	91	—	6		
United States	29	4	15	—	21	—	3	—	21	15	30	—	19		
Japan	14	4	13	2	17	2	6	—	54	8	50	45	10		

Norie and Raper are standard ones, and new editions of them have often been published. *The History of Navigation*, ascribed erroneously to John Locke, the philosopher, may be read not without profit.

Navigation Acts. THE, were laws passed at various times for regulating the conditions under which foreign ships might trade with Great Britain, and for controlling the privileges of British shipping. Under Henry VIII. and Elizabeth foreign ships were excluded from English coasting trade. Cromwell excluded all foreign unlicensed ships from trade with America; and in 1651 the Navigation Act forbade the importation to England of goods unless in English ships or ships of the producing countries. The measure provoked the Dutch, who then did much of the carrying trade of the world, to make war, but they did not succeed in procuring its repeal. Another Act of 1660 provided for the exportation of all colonial products in English bottoms. One of 1663 forbade the colonies to receive goods except in English vessels. The Navigation Act of 1672 reaffirmed and enlarged

Some of these were from time to time hired by the Government for service as vessels of war, but the distinction between the merchant navy and the royal navy may be said not to have begun to develop in a permanent form until about the reign of Henry VII., and for at least a century afterward it was not very strictly defined. Of the ships which served against the Spanish Armada in 1588 only 34 belonged to the Government out of a total of 197 sail employed; and up to the close of the seventeenth century it was a not uncommon thing for merchant officers to be given commands in the royal navy and for the naval officers to do duty in the merchant service. The biggest merchant vessels of Elizabeth's reign appear to have been of not more than 400 tons' burthen. Thereafter, during two hundred years, they grew little larger, though they vastly increased in numbers. After the establishment of the East India Company the ships of that powerful corporation were for a long period the largest merchant vessels that sailed from British ports; but up to 1770 the biggest British East Indiaman afloat was of no more than 500 tons. Thenceforward progress was more rapid,

and before the conclusion of the century ships of as much as 1,200 tons became comparatively common. The long, harassing wars, which began in 1793 and lasted with scarcely any intermission until 1815, found the British merchant navy in a more flourishing condition. It then included about 16,000 sail, averaging, however, not more than 130 tons. After a brief experience of the effects of war, most people appear to have believed that long-continued hostilities could not fail to be fatal to British seaborne commerce; but, as a matter of fact, the number of losses of ships by capture at no period very greatly exceeded the number of losses of ships by the ordinary and inevitable risks of the sea; and, when the country had once grasped this fact, its merchant navy, instead of being extinguished or even being diminished, began to advance by leaps and bounds. Its development was further assisted by the commercial policy of France, and especially by that of Napoleon, which in time had the effect of handing over the major part of the carrying trade of the world to Great Britain and the United States. In 1795 the British mercantile marine included 16,728 vessels; in 1800, 17,885; in 1805, 22,051; and in 1810, 23,703; and in size as well as in numbers the ships had increased. In 1792, the last year of the peace, the value of British exports and imports was but £44,565,000; in 1796 it grew to £53,706,000; and in 1800 to £73,721,000. Since then it has never, for many years in succession, ceased to grow; but for nearly half a century after the conclusion of the war the mercantile supremacy of Great Britain at sea was seriously threatened by the energetic action of the United States. The rivalry was at length checked by the effects of the Civil War in America; and from the day of the opening of that conflict Great Britain has stood alone. The relative rate of progress of the mercantile marine of the chief commercial Powers is best shown by the following table of the amount of the sea-going tonnage belonging to the various countries in the decennial periods from 1850 onwards and for 1905. To save space, the three last figures are in every case omitted, so that the sums must be read as expressing "thousands of tons":—

	1850.	1860.	1870.	1880.	1910.
British Empire ..	4,232	5,710	7,149	8,447	13,283
United States ..	1,585	2,546	1,510	1,852	6,460
France ..	658	996	1,072	919	1,452
German Empire ..	—	—	952	1,182	2,825
Norway ..	298	558	1,022	1,611	1,577
Italy ..	—	—	1,012	999	1,463
Sweden ..	—	—	346	542	770
Holland ..	292	433	359	328	459
Denmark ..	—	—	178	249	541
Austria-Hungary ..	—	—	829	220	497

The altogether exceptional position of the British Empire as a commercial sea-power is further and more strikingly shown by means of the appended statistical comparison, from which it will be seen that nearly one-half of the total shipping tonnage in the world belongs to the Empire.

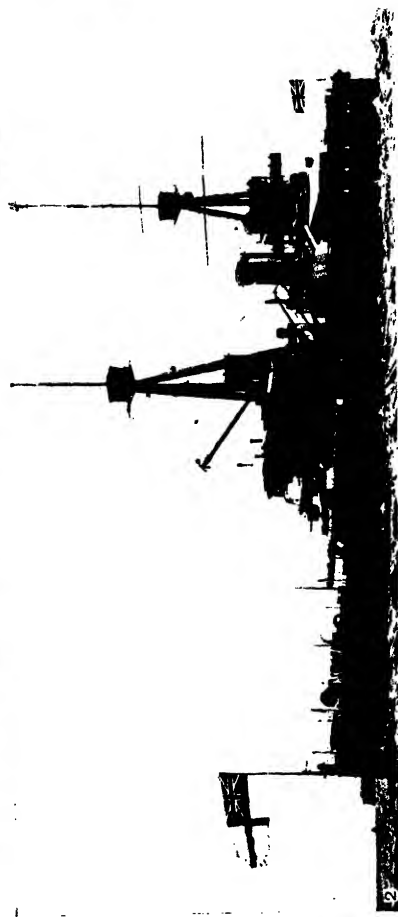
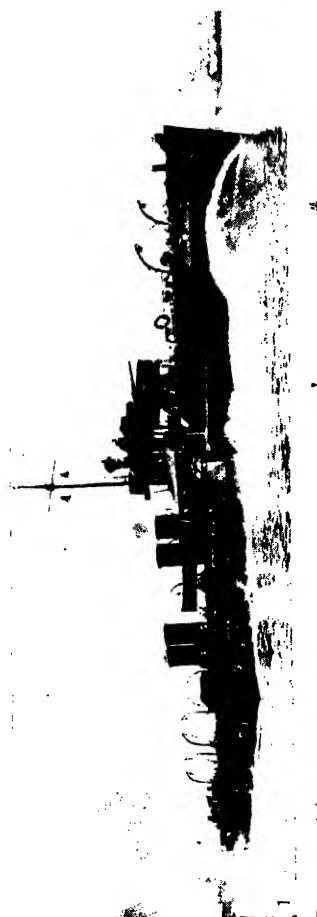
In this table—which gives the figures for 1909–10—are included all vessels of over one hundred tons.

	VESSELS.	TONNAGE.
United Kingdom ..	9,500	17,880,000
Dominions Oversea ..	2,100	1,449,000
BRITISH EMPIRE ..	11,600	18,829,000
Other Countries of the World	18,950	22,621,000
TOTAL	30,550	41,450,000

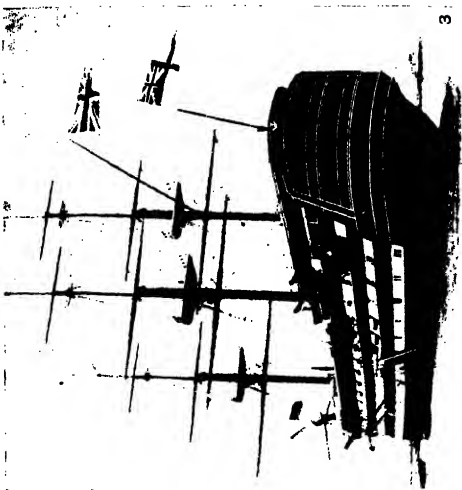
Of the above total of ships for the British Empire, 1,800 are sailing vessels and 9,800 steamships. The proportion of the world-total under this head is 8,500 and 22,050 respectively. At the beginning of 1910 there were on the seas 2 ships only of over 30,000 tons, and both were British (*Mauretania*, 31,938 tons; *Lusitania*, 31,550 tons). Of the 9 over 20,000 tons, 4 were British and 3 were German. Since then the White Star liner *Olympic*, 882 feet long and 45,000 tons, has been launched (Oct., 1910); a German liner, 882 feet long and of about an equal tonnage to the *Olympic*, is being built, and in Nov., 1910, the Cunard Company took preliminary steps for the building of a liner 885 feet long, 95 feet beam, and a total displacement of 50,000 tons, the largest ship in the world.

The British Mercantile Marine, under Act of 1854 and 1867, was entrusted to the superintendence of the Board of Trade. Numerous special Acts have been passed in the interests of seamen, passengers, freighters, and owners. British merchant vessels are entitled to fly the Red Ensign if they are hired for naval purposes.

Navy, THE ROYAL. The origin of the Royal British Navy may, with an approach to truth, be said to be lost in the mists of antiquity. To Alfred the Great is usually attributed its beginning, inasmuch as he was compelled to defend his kingdom from piratical invaders from the North and from the Danes. His successors' victories led to the increase and development of the fleet. In early days the sovereigns mainly relied for the defence of the coasts and of the narrow seas upon the right which they possessed of calling upon a certain part of the population not only to serve at sea, but also to supply ships. In 1066 William the Conqueror established the Cinque Ports, granting them privileges on condition that they furnished 52 ships, each carrying 24 men, for 15 days. Richard I. took a fleet to Palestine, and King John, claiming the sovereignty of the sea, required all foreigners to strike to the English flag, which was yielded until 1815, when the custom fell into disuse. Many kings, however, also had ships of their own, and these may be said to have formed a royal navy. Not until Henry VIII.'s time was there perhaps a royal, in the sense of a national, navy. Henry organised one, and although he did not create a permanent body of officers, his constitution of the navy was not, in other respects,



1. DESTROYER: H.M.S. "Usk" (RIVER CLASS) GOING FULL SPEED
2. ARMoured CRUISER: H.M.S. "INDOMITABLE"



3. H.M.S. "VICTORY."
4. SUBMARINE D.1.
5. H.M.S. "TEMERAIRE," FIRST CLASS BATTLESHIP

Photos: 1, 4, Cribb, Southsea,
2, 5, West & Son, Southsea.

different from that which is in force to-day. He constituted the Admiralty and Trinity House, and made the sea-service a separate profession. Under Elizabeth the force was largely increased, and in her reign signals between ships were first used. Her victory over the Spanish Armada in 1588 was decisive. The English fleet then comprised 197 ships of all sorts and 14,996 men. Sea-officers as a specially trained class, appeared under the Commonwealth, and, under James II., who was himself a seaman of ability, became the only class generally capable of holding naval command. James also introduced the system of half-pay, and effected numerous further improvements. In the eighteenth century the British and French fleets had the pre-eminence, and though during the American War, 1812, Great Britain's position was threatened if not actually jeopardised, since Trafalgar (October 21st, 1805), her control of the sea has been so complete that she has hardly realised the growth of foreign navies. From a very early date until 1649, and again from 1660 to 1673, from 1684 to 1689, from 1702 to 1708, and in 1827-28, the navy was governed by a Lord High Admiral. The discipline of the navy is provided for by the Naval Discipline Act, or Articles of War, a measure which, with usually no alterations, is renewed annually, and by the King's Regulations and Admiralty Instructions, which are established by Order in Council, and very frequently added to or modified. Offences which are sufficiently serious are dealt with and punished by court-martial, sitting under and punishing in accordance with these provisions. Naval officers are either military or civil. The former, in order of rank beginning with the highest, are: admirals of the fleet; vice-admirals; rear-admirals; commodores (*i.e.* captains so appointed); captains; staff-captains; commanders; staff-commanders; lieutenants; navigating lieutenants; sub-lieutenants; navigating sub-lieutenants; chief warrant officers (chief gunners and chief boatswains); warrant officers (gunners and boatswains); midshipmen and naval cadets. The civil officers, in similar order, are: inspectors-general of hospitals and fleets; secretaries to admirals of the fleet; paymasters-in-chief; chief inspectors of machinery; deputy-inspectors of hospitals and fleets; senior inspectors of machinery; senior secretaries to commanders-in-chief; junior inspectors of machinery; junior secretaries to commanders-in-chief; fleet surgeons; fleet paymasters; fleet engineers; secretaries to junior flag officers; staff-surgeons; staff-paymasters; senior naval instructors; staff-engineers; paymasters; chief engineers; secretaries to commodores of the second class; junior naval instructors; surgeons; senior assistant-paymasters; senior engineers; medium assistant-paymasters; junior engineers; junior assistant-paymasters; assistant engineers; chief carpenters; carpenters; head schoolmasters; clerks; assistant-clerks and engineer students. Chaplains hold no naval rank, "but retain when afloat the position to which their office would entitle them on shore." The navy, it may here be noted, is senior to the army, and takes precedence of it. The expression "Army and

Navy" is therefore incorrect, while "Naval and Military" is quite as it should be. In cases in which officers are otherwise of equal relative rank, a naval officer consequently precedes, or even takes command of, an army one. In 1805 the navy included 175 ships of the line and 246 frigates. With these may be compared the 80 ironclads and 114 cruisers of the British Empire in 1893. The modern vessels, it must not be forgotten, are, upon an average, of five times the tonnage of the old, and of ten times the costliness. Nelson's *Victory* in 1765 cost about £17 a ton to build; the *Royal Sovereign* of 1891 cost nearly £60 a ton for hull and machinery alone; and all her expensive guns and fittings had still to be paid for, and, as in point of numbers, so also in point of size did ships increase even before Nelson's day. The largest warship of Elizabeth's time was of not more than 1,000 tons' burthen. In 1667 a 100-gun first-rate measured 1,500 tons; in 1719, 1,870 tons; in 1745, 2,000 tons; in 1780, 2,200 tons; and one of the last 100-gun ships constructed was of 3,727 tons' burthen, or 5,724 tons' displacement; but this is, of course, little in comparison with the *Magnificent's* displacement of 14,900 tons. In 1859 a revolution in naval construction was effected when, at the suggestion of Napoleon III., *La Gloire*, launched at Toulon, was protected with iron plates. The first British ironclad, the *Warrior*, was launched in 1861, but it was found the armour caused the wood beneath to rot. The evolution of the turret-ship was due to the victory of the *Monitor*, designed by Captain Ericsson, over the *Merrimac* during the American Civil war. In 1862 the Admiralty tried the experiment with a three-decker cut down, the *Royal Sovereign*, fitted with four turrets each carrying two 9-ton guns. Controversy raged as to the merits of the new ships. The advantage claimed was that the turret being placed in the centre of the ship, the weight of the guns and armour was more evenly distributed, and afforded greater protection to the men and the guns. A new danger then had to be considered, the exploding of mines and torpedoes beneath the water. The secret of the Whitehead fish torpedo was purchased by the British Government in 1871, but it has since been acquired by other nations. Since 1880 steel breech-loading guns have been substituted for the old muzzle-loaders, increased velocity being required to penetrate the thicker modern armaments. On the introduction of fast-steaming torpedo boats, battle-ships, with a number of lighter guns, were built, with four 67-ton guns mounted in pairs, *en barbette*, in heavily-mounted redoubts instead of turrets, the improvement lying in the fact that with the *barbette* the guns are higher above the water. One of the finest recent achievements of British naval science was embodied in the *Bread-nought* (the first of that class), launched by the late Edward VII. on February 10th, 1906. Her first keel plate was laid on October 2nd, 1905, and she was completed, at a cost of over one million and three quarters, in 1907. Designed by Sir Philip Watts, she represented the ideas of the most experienced naval advisers. Propelled by turbine engines, whereby speed and space were

gained and weight saved, her main battery consisted of ten 12-inch guns arranged in pairs in hooded *barbettes*, which throw projectiles of 850 lbs. weight. By these means her fighting value was equal to that of any two or three ships afloat, and she was not only the most powerful but the largest and fastest battleship in the world. She was as nearly unsinkable as human skill could make her, and her officers' quarters were placed forward, near their post of duty, a position which had been often suggested, but which custom had hitherto successfully hindered. A modern warship is fitted with every device science can suggest. Hydraulic power moves the turret and the turntables of the *barbette*-ships, and loads and works the guns, which are fired by electricity, except the small quick-firers. The ships have become floating factories, and the crew include a large number of men with engineering knowledge. The developments of recent years have to a very great extent altered the nature of the qualifications needed in the good sea-officer, who must now be not merely the navigator, the mariner, and the brave man whom he was required to be in Nelson's day, but, in addition, be well versed in mechanics and the co-related sciences.

Navy Board. THE. Upon the restoration of Charles II., his Majesty appointed a Treasurer, Controller, Surveyor, and Clerk of the Navy, who were styled Principal Officers. To them were added a few months later three Commissioners "to assist the said Principal Officers in the management of the affairs of the Navy." These seven individuals formed the Navy Board. The number of members was at various subsequent periods modified; but the Navy Board continued to manage the civil affairs of the navy until 1832, when it was abolished and its work put under direct control of the Board of Admiralty. The Navy Board met at the Navy Office, which in the earlier days of its existence was on Tower Hill, London, and in the later at Somerset House.

Nawanagar, or NOWANUGGUR, a native state, Bombay Presidency, India, on the southern shore of the Gulf of Cutch. It occupies an area of 3,393 square miles and its population is estimated at 400,000. It is flat as a whole, but part of the Barda Hills (highest point, Mount Venu, 2,057 feet above the sea) lies within the territory. Marble, copper, stone, and iron occur. The principal products are wheat, rice, and cotton, with some tobacco and sugar-cane, and silk and cloth are the chief manufactures. There is a small pearl fishery off the shore. The capital, NAWANAGAR, is a flourishing seaport, 310 miles N.N.W. of Bombay. It was founded in 1540 by Jam Rawal, is almost wholly built of stone, and is surrounded by a fort constructed in 1788. It is known for its silken and gold embroidery, incense and perfumery, and cloth factories. Pop. (1901), 53,844.

Naxos, an island in the Greek archipelago, the largest and most fertile of the Cyclades. It is a beautiful mountainous island (highest point 3,300 feet above the sea), 19 miles long by 15 broad, and contains 175 square miles. Granite, marble, serpentine, and emery are exported. The chief products are fruit, wine, oil, wax, honey, and cheese. The island was settled by Ionians from Athens, and was famous for its wine and its part in the legendary history of Dionysos and Ariadne. During the Venetian ascendancy it formed, with other islands, the Duchy of Naxos. The Turks captured it in the sixteenth century, but it was restored to Greece in 1824. Pop., 16,000. The capital, NAXOS, on the north-western coast, has a harbour and is the seat of a Greek bishop. Pop., 2,000.

Nazareth, a town of Palestine, formerly in Galilee, now in the pashalik of Acre, and 65 miles N. of Jerusalem. Its interest chiefly lies in its being the place where Christ spent His childhood and boyhood. It possesses a Franciscan church, a



Photo.]

NAZARETH.

[Donlla.

mosque, a Protestant church and schools, a house for guests, and an orphanage for Arab girls. The church of the Latin convent stands on the reputed site of the house of the Virgin, the scene of the Annunciation. Pop., 10,000.

Nazarites, amongst the Hebrews, indicated those who had separated or consecrated themselves to God by vow. The devotees were required to abstain from wine, to wear their hair uncut, and, generally, to lead an ascetic life. They were also forbidden to approach a dead body, even that of the nearest relative. In earlier times the conditions were much less rigid than they afterwards became. The regulations governing Nazarites were laid down in Numbers vi. 1-21. The vow was undertaken either for a short specified period, as thirty days, or for life, as in the case of Samson, Samuel, and the Baptist John. The custom prevailed among the Arabs, with whom, however, it involved a vow of war or revenge. Till this was redeemed the

subject of it left his hair unshorn and did not touch wine, women, ointment, or perfume.

Neagh, LOUGH, the largest lake in Ireland, has Antrim on the N. and E., Armagh on the S., and Tyrone and Londonderry on the W. There are few islands, the shores are swampy, and the lough receives the Bann, Blackwater, Main, and Ballinderry, while the northern outlet communicates with the Lower Bann, and so with the Atlantic. Owing to its slight elevation, the lake, which is 17 miles long, 11 miles wide, and contains 153 square miles, might easily be drained. Its deepest part is about 100 feet.

Neal, DANIEL, historian and minister, was born in London on December 14th, 1678, and educated at the Merchant Taylors' School, and at the Universities of Utrecht and Leyden. In 1704 he was appointed assistant to Dr. Singleton, minister of an Independent congregation in Aldersgate Street, London, and on his death was made his successor in 1706. His *History of New England* was published in 1720, and in recognition of its merits the University of Harvard honoured him with the degree of M.A. In 1722, Lady Mary Wortley Montagu, having aroused great opposition by her endeavours to introduce inoculation, Neal courageously wrote a preface to *A Narrative* by Benjamin Colman, on the subject, in which he expressed a wish not to dogmatise, but to help the public to decide whether inoculation would prove serviceable or prejudicial to mankind. The first volume of his most important work, *The History of the Puritans*, undertaken at the wish of his co-religionists, appeared in 1732, Neal availing himself of materials which Dr. Evans had collected. It was highly commended by his party. The Puritans he "blanches into a sweet and almond whiteness," it has been quaintly said, but while his conscientiousness was praised, his impartiality is open to question. The learned antiquary, Zachary Grey, subjected the work to severe criticism, charging Neal with mistaking or falsifying his authorities. Neal did not reply, perhaps because his health was failing. He died on April 4th, 1743, and was buried in Bunhill Fields, London.

Neale, JOHN MASON, hymn-writer and divine, was born in London on January 24th, 1818, and educated privately and at Trinity College, Cambridge. In 1842, he was ordained to a cure at Crawley, and in 1845 was appointed Warden of Sackville College, East Grinstead. In 1856 he founded the Sisterhood of St. Margaret. Neale died at East Grinstead on August 6th, 1866. He wrote a *History of the Eastern Church* (published in 1873), *Medieval Preachers* (1856), *History of the Jansenist Church of Holland* (1858), and many interesting short stories and legends; but it is for his hymns, original and translated, that he is chiefly known, among them being "The day is past and over," and "Jerusalem the Golden."

Neander, JOHANN AUGUST WILHELM, church historian, was born at Göttingen, Prussia, on January 17th, 1789. He was of Jewish parentage, but publicly renounced the faith in 1806, and became a

Christian. Before this his name had been David Mendel, and, on his mother's side he was connected with Moses Mendelssohn. He was educated at Hamburg, Halle and Göttingen. In 1812 he was appointed professor of theology at Heidelberg, and the same year to a similar post at Berlin University, where he remained till his death on July 14th, 1850. He was a great authority upon historical theology, and was much loved by his pupils. His many works, several of which have been translated into English, were collected in one edition in 1862. The more important were *Allgemeine Geschichte der Christlichen Religion und Kirche* (6 vols., 1825-52); *Der Leben Jesu Christi*, in answer to Strauss (1837), and *Geschichte der Christlichen Dogmen* (1856).

Neanderthal, a valley in Rhenish Prussia, in the district of Düsseldorf. It is famous in connection with the discovery in a cave, in 1857, of a skull supposed by some anthropologists to be that of a primitive cave-dwelling man, with characters approaching the simian type.

Nearchus, who flourished in the latter half of the fourth century B.C., was a captain of Alexander the Great. He conducted a fleet from the Indus to the Persian Gulf, and as a reward received a garland and one of Alexander's wives. Fortunately, he wrote an account of his voyage, *Paraplylus* (*Periplus*), which has been preserved by Arrian in a treatise on India.

Neath, a town of the county of Glamorgan, Wales, 8 miles N.E. of Swansea, on the navigable river Neath. It has important iron foundries, copper and tin works, stone quarries, and manufactures of chemicals. There are remains of the old castle destroyed in 1231. Pop. (1901), 13,720.

Nebraska, one of the states of the American Union, having South Dakota on the N., Wyoming and Colorado on the W., Kansas on the S., and separated from Iowa and Missouri on the E. by the Missouri river. Its area is 76,840 square miles, most of it wild and uncultivated. On the west the Rocky Mountains form the Atlantic and Pacific watershed. Its chief rivers are the Missouri, the North and South Platte, and a fork of the Kansas. The centre is part of the Great American Desert; in the east are extensive prairies, and in the north-west are the Mauvais Terres, or Bad Lands, where the surface is hewn into towers, cliffs, and other fantastic shapes. The climate is good and there are warm summers. The rich soil produces Indian corn, wheat, oats, barley, rye, potatoes, tobacco, hay, and beet. There is a considerable yield of wool, and the raising of live-stock is an important pursuit. The chief manufactures are agricultural implements, boots and shoes, lumber and cooperage, flour, tobacco, bricks, tiles, saddlery, salt and lime. Brewing and dairy produce also furnish a brisk trade. The most populous town is Omaha (155,800), and Lincoln (61,254), the capital, is the seat of the University of Nebraska and of other important institutions. Nebraska became a State in 1867. Pop. (1910), 1,500,000.

Nebraska City, the capital of Otoe county, Nebraska State, United States, on the right bank of the Missouri. It contains the State asylum for the blind, and the Academy of the Annunciation. The leading industries are the making of starch and agricultural implements, brewing, flour-mills, and those connected with stock-yards and packing-houses. Pop.(1900), 7,380.

Nebulæ are bright patches seen in the sky, consisting either of far-distant stars or of matter in a less condensed state. The number of nebulæ known before Sir W. Herschel's time was only about 100, but by using a better telescope he increased the number to about 2,000. The great improvement in telescopes has enabled more and more of these nebulæ to be resolved into clusters of stars, and it is supposed that, if the power of telescopes could be increased to any extent, all nebulæ could be so resolved. Nebulæ vary greatly in form and appearance; some are clearly clusters of stars, others are perfectly hazy. A round or oval form is sometimes exhibited, with a gradual condensation towards the centre, and a number of stars standing in the centre of a nebulous haze can be observed. Observations on nebulæ caused Kunt and Laplace to suggest a theory—now known as the Nebular Theory—as to the formation of worlds. They considered that the solar system, for example, originally existed as uncondensed nebulous matter. This gradually condensed towards the centre, forming the nucleus of the sun, and later the outer parts separated into distinct parts, each part condensing into a planet. The different forms of nebulæ observed in the heavens were then supposed to be systems in different stages of development. Although instruments, such as Lord Rosse's telescope, have shown that so many nebulæ can be resolved into star clusters, yet, on the other hand, the spectroscope has shown us that many nebulæ do really consist of uncondensed matter.

Necessaries (LAW OF INFANTS). By the law of England an infant is not, in general, bound by the contracts made during minority (under 21 years of age). But to this rule there is an exception which was stated by Coke in language that has been considered ever since as a complete epitome of the law: "An infant may bind himself for his necessary meat, drink, physic, and such other necessities, and likewise for his good teaching or instruction, whereby he may profit himself afterwards." The law has not altered since these words were written, nearly 300 years ago. At the same time, cases have arisen from time to time in which the limitations of the law have been discussed. The result of these cases has been to declare that Necessaries is a word not strictly limited to the things barely sufficient to maintain life. Thus, to take the important necessary of clothing—an infant may bind himself to pay for clothes that are more than sufficient to cover him decently and protect him from the weather. If he orders clothes that are in accordance with his station in life, he must pay for them. For example, an evening-dress suit is not, in the narrowest sense, a necessary for anybody.

But if a young man, an infant, of the upper or middle classes were to order a dress suit on credit, it would undoubtedly be held to be a necessary in law, on the ground that, in his rank of life, he would be unable to mix in the society of his friends without such a dress. Again, such a young man would not be held bound to go to a cheap tailor, on the ground that he would be expected, not only to wear an evening suit, but to wear a well-cut one.

In one case (*Peter v. Fleming*) it was held that a watch-chain was a necessary for an undergraduate of good family, on the ground that he must have a watch, and a chain was a necessary accessory. In this case it was a gold chain. But in the same case it was laid down by Baron Parke that articles purely ornamental—*e.g.* diamond rings—could not be necessities for an infant.

The rule may be stated to be, then, that "necessaries" include all such articles of food, clothing, and necessary convenience as a person in the particular infant's rank of life uses, and of the quality usually affected by such persons, but excluding all articles that are purely ornamental. But, although contracts to pay for necessities are binding on infants, an infant is not bound to repay borrowed money, even if he borrowed it to pay for necessities.

A further point in this connection is, that the necessary must not only be a necessary in law, but also in fact. Thus, an evening suit is a necessary in law for the son of (say) a peer; but if such a youth orders an evening suit when he already has a perfectly good one, the second suit is unnecessary in fact, because the infant is already well supplied. The creditor who supplies articles, in law necessities, must always be prepared for the defence that the particular articles he supplied were unnecessary in fact at that particular time to that particular infant. An infant is also bound by a contract of apprenticeship, though, on attaining majority, he may cancel it. A contract of service, also, is fully binding on an infant. But, in the two latter cases, as the reason of binding the infant is that such contracts are for his benefit, if he is able to show that the contract is a disadvantageous one—palpably disadvantageous—it is not binding on him. Most contracts of infants are voidable only, *e.g.* a lease by or to an infant, a marriage settlement by an infant. That is, the infant, when he comes of age, can either avoid the contract and altogether escape from it, or can elect to abide by it. If he does the latter he is bound for better or worse. An infant who wishes to avoid such a contract must do so within a reasonable time after coming of age. A promise of marriage is not binding on an infant; but if, after he comes of age, he proposes anew, and makes a fresh promise, he is bound. Certain other contracts are absolutely void and of none effect, and can never be made good. (*Infants Relief Act, 1874.*) The contracts aimed at by this statute are those commonly entered into with money-lenders and tradesmen of a certain class. They are: (1) contracts for money lent or to be lent; (2) contracts for goods supplied or to be supplied (except necessities); (3) accounts stated. The two first, (1) and (2), explain them-

selves; number (3) may require elucidation. An account stated is a contract arising thus: A and B have accounts between them—debts and credits on each side. One day they strike a balance, and the one who is found to be in debt to the other agrees to pay him the balance found due. This is an account stated. It may easily be seen how a money-lending transaction could be disguised as an account stated; and for this reason that kind of contract, made by an infant, is absolutely void. It has been decided that goods supplied to an infant trader are not necessities and cannot be sued for. Therefore an infant cannot be made a bankrupt. At common law, a bill of exchange given by an infant, no matter for what consideration, is void. But although an infant is not liable for goods sold (except necessities) or money lent, yet if he obtains credit or procures a loan by a false representation that he is of age, so deceiving the creditor, he is liable to an action for fraud. For an infant is liable, as much as an adult, for wrongful acts committed by him, such as fraud, negligence, and the like. It may be mentioned that it is a criminal offence (Betting and Loans to Infants Act) to send touting circulars offering to bet with or lend money to an infant.

Neck. In the middle line of the front of the neck just beneath the skin is the cartilaginous framework of the larynx, the prominent thyroid cartilage being readily distinguishable in that situation. Just above the upper margin of this cartilage is situated the hyoid bone. The prominent muscles which stand out on either side when the head is turned to the right or left are the sterno-mastoids. Just within the inner borders of these muscles the pulsation of the carotid artery can be distinctly felt; this vessel is accompanied in its course by the internal jugular vein and the pneumogastric nerve; the external jugular vein lies more superficially, and can be distinctly seen as a blue line beneath the skin in the neck of a thin subject. The thyroid gland, the lobes of which lie on either side of the wings of the thyroid cartilage, is not, as a rule, a prominent object, unless enlarged by disease, in which case it produces the disfigurement associated with goitrous affection. A stiff neck is commonly due to painful affection of the muscles of the neck, mainly the sterno-mastoids; in rare instances what is described as stiff-neck may be due to disease of deeper-lying structures.

Neckar, a tributary of the Rhine and the chief river in Wurtemberg, rises near Schwenningen in the Black Forest. After a winding course of 250 miles, first in an easterly direction, then northerly, and finally westwards, it falls into the Rhine at Mannheim, being navigable for the lower half of its length from Cannstadt. On its banks are Tübingen, Heilbronn, and Heidelberg. The district around produces wine, and is famous in legendary lore.

Necker, JACQUES, financier and statesman, was born at Geneva, Switzerland, on September 30th, 1732. He became a banker's clerk in Paris at the age of fifteen, and in 1762 founded the

London and Paris Bank of Thellusson and Necker. He soon afterwards became a syndic of the French East India Company, and minister in Paris for the republic of Geneva. In 1764 he married Suzanne Curchod, an old flame of Gibbon's, and the *salon* of Mme. Necker soon grew famous. After writing a Protectionist essay on *Commerce des tirains*, he was made Director of the Treasury in 1776, and Director-General of Finance next year. In spite of difficulties growing yearly more insuperable, he worked honestly for the good of the country, and inaugurated a system of annuities and *monts de pitié*, while he wished to put the assessment of taxes in the hands of provincial assemblies. This project caused his dismissal, the pretext being his *Compte Rendu*, which he brought out in 1781, frankly setting forth the financial condition of the State. He retired to Geneva, but returned to France and was reappointed to his former office in 1788. He was unequal to coping with the appalling crisis that had arisen, however, and finally returned to Coppet, his place near Geneva (1790), where he died on April 9th, 1804. Madame de Staël, the great woman whom Napoleon persecuted with relentless malignity, was his daughter.

Necromancy, the art or practice of divination by calling up the spirits of the dead that they may answer questions put to them (*cf.* Deut. xviii. 11; 1 Sam. xxviii. 7-25). The so-called materialisation of the departed at spiritualistic *séances* is a form of necromancy. Late in the Middle Ages the term was applied to magic generally from an erroneous derivation.

Necrophorus, the genus of Coleoptera including the Burying Beetles. It is so called because the beetle lays its eggs in a ball of dung and buries this in the ground. The genus includes many of the largest of the section of beetles known as the Necrophaga.

Necropolis, literally, a city of the dead. The word described the burying grounds in the vicinity of ancient towns, a sense in which it is often employed in the present day. The chief cemetery in Glasgow is called the Necropolis, and at Woking, in Surrey, there is a ground bearing this name. It was the custom among classical peoples to deposit in the tombs of departed friends objects of art and other articles, while in many cases the tombs themselves were decorated with sculpture, painting, or with other more or less elaborate ornamentation. Such remains and memorials have thrown valuable light on the bygone civilisation of the towns or districts in which they have been found.

Necrosis, the death of a portion of bone due to inflammation with stoppage of blood supply, or to injury. If a superficially-lying portion of the bone dies and becomes separated from the living bone beneath, it is said to exfoliate. In some instances the dead portion becomes enclosed in new bony growth, so that the dead piece (sequestrum, as it is called) lies in a cavity of living osseous tissue. In some cases almost the whole of one of the long bones may become necrosed. A peculiar

form of necrosis, now rarely seen, is that which affects the lower jaw in those who are engaged in working in phosphorus. It was formerly common among the makers of lucifer-matches. The treatment of necrosis consists in supporting the strength of the patient during such time as is occupied in the separation of the dead from the living bone. In some cases the operation known as sequestrotomy is necessary to effect the removal of the sequestrum. In those instances where a large portion of bone is necrosed, and where high fever is present and a septic condition is set up, amputation may be necessary.

Nectar, in Greek mythology, was the drink of the Olympian gods, ambrosia being their food. It conferred immortality and this is perhaps the meaning of the name.

Nectary, any part of the flower which secretes the saccharine exudation, designed to attract insects, known as nectar. The term is physiological, nectaries being formed in different cases from very various parts; but their position and form are always related to insect-pollination. In all cases, moreover, the nectary seems to consist of a group of rather large thin-walled cells extending to the surface of the organ. In the Labiatae, the heath tribe, the oranges, and other cases, the nectary is a ring-shaped cushion, below the ovary, produced from the floral axis. In the Cruciferae, it is represented by four or six roundish glandular outgrowths from the axis, between the filaments. In the Umbelliferae and the Compositae it is at the base of the style, above the inferior ovary. In the Crown Imperial (*Fritillaria imperialis*) there are conspicuous white hollows, secreting nectar, at the base of each perianth-leaf. The small scales at the base of the petals of the buttercup lead by numerous transitional types to the tubular green petals of *Helleborus*, the spurred petals of the Columbine and curious hammer-headed hollow petals of the monkshood. In the rhubarbs the base of the filament of the stamen is the secreting organ; whilst in the order Gesneraceae a whole stamen is aborted into a nectary. The secreted nectar is sometimes, as in *Salvia*, held up by a circlet of hairs, or may collect at the bottom of the flower, retained by the perianth leaves; but in other cases special hollow receptacles known as spurs are developed by either the calyx or the corolla. These may either be themselves secretory, as in orchids, or may merely receive nectar secreted by other organs.

Needle-gun, a breech-loading rifle in which the powder in the cartridge was ignited by the rapid impact of a needle passing through and sliding in the breech-piece and operated by a spring-bolt, which drives it completely through the powder. The Prussian needle-gun was the first in which this principle obtained, and the havoc of its execution during the brief Austro-Prussian campaign of 1866 led to the weapon being adopted in the military equipment of other Powers. This type of fire-arm has itself been superseded by other rifles of still greater precision and efficiency.

Needle-Nosed Flea (*Anthocoris nemorum* Fabr.), a small black bug which lives on hop plants. It is generally supposed to do great damage to the hops, but more probably it really attacks the larger insects which are the cause of the damage.

Needles. The origin of the sewing-needle dates back to a pre-historic era. Needles were originally made of bone or ivory, as is still the case amongst savage races. In civilised regions these materials were discarded on the discovery of bronze, for which steel was afterwards substituted. Many needles of bronze and bone with eyes have been found in the sites of the ancient European lake-dwellings and in caves. The manufacture of steel needles originated at Nuremberg in the latter part of the fourteenth century, and was introduced into England early in the reign of Elizabeth, but did not make much way till the middle of the seventeenth century. The chief seat of the industry has always been Redditch, in Worcestershire.

Neerwinden, a village in the province of Liège, Belgium, 5 miles S.E. of Tirmont. It is famous as the field of two battles, for here on July 29th, 1693, Marshal Luxembourg defeated the English under William III., and on March 18th, 1793—a century later all but a few months—the Allies under the Prince of Coburg defeated the French under General Dumouriez.

Negapatam, a seaport on the Coromandel coast, Madras Presidency, India, 46 miles E. of Tanjore. A brisk trade is carried on mainly with Ceylon, Burma, and the Straits Settlements. One of the earliest of the Portuguese colonies, it was captured by the Dutch in 1660, and by the British in 1781. Pop. (1901), 57,190.

Negritos (NEGRILOS), Spanish diminutive of Negro, applied originally to the dwarfish Negro or Negroid aborigines of the Philippine Islands (*Aetas* or *Itas*), then by extension to the other populations of similar type in Malaysia, such as the *Sakais* of the Malay peninsula, the *Karons* of New Guinea, and the extinct *Kalangs* of Java; lastly to all dwarfish Negroid peoples, and more especially to those of Africa, Bushmen in the extreme south. Obongos in the extreme west, Batwa and many others scattered over the forest zone of the Congo basin. A Negrito element appears to have formed the substratum of the population in India, and this element has been traced by De Quatrefages and other ethnologists up the southern slopes of the Himalaya, and as far west as the Sistan district on the Perso-Afghan frontier. Everywhere they are regarded as the true aborigines, probably sprung from a single stock which, in the early Quaternary period spread over the African, Oceanic, and South Asiatic regions at a time when a great part of the Indian Ocean was still dry land (the Lemurian continent), so that migration could easily take place across the southern hemisphere from the Atlantic Ocean to the Pacific. Later these regions were invaded by higher or more powerful races, Negroes

and Hamites in Africa, Papuans, Malays, and Polynesians in Oceania, Kolarians in India, by whom the Negritos were everywhere exterminated or dispersed and broken into isolated groups and scattered fragments, as is now their normal condition in Malaysia and Central and South Africa, where alone they survive as distinct racial communities. These communities have been separated for so many ages that they no longer possess any kind of linguistic unity, if it ever existed, and many, as in the Philippines, the Malay Peninsula and the Welle basin (North-east Congo-Land) speak the languages of the more civilised intruders in their domain, either exclusively or jointly with their mother tongue. The physical type also differs considerably, though nearly all have in common a yellowish-brown complexion, never dark enough to be called black; a very pronounced prognathism, quite ape-like



NEGritos OF THE PHILIPPINE ISLANDS.

amongst the Simangs of the Malay Peninsula, the Javanese Kalangs, and the Akkas of South Mangbatuland (Welle basin); short, black woolly hair, usually spread in separate tufts over the scalp; disproportionately large heads and small extremities; lastly, low stature, falling considerably below that of all other races, and ranging generally from about $3\frac{1}{2}$ to $4\frac{1}{2}$ feet, but always under 5 and above 3 feet. Socially they stand also at the lowest stage of culture, with no arts, no religion, no agriculture, no stock-breeding, scarcely any fixed abodes, and these mostly frail huts or windward screens of branches and foliage, and no food except the produce of the chase, vermin, roots, and berries. On the other hand, many of the African groups display extraordinary skill, courage and activity in attacking large game, such as the elephant and buffalo,

with their bows and poisoned arrows, almost the only weapon of all Negrito tribes. They also show much natural intelligence, but are extremely difficult to domesticate, and scarcely any have ever been induced to adopt settled lives or conform to a rudimentary standard of culture.

Negro (Span. "Black"), a term popularly synonymous with "African," but in ethnology restricted to that section of mankind specially distinguished by its dark complexion, which, however, is rarely a true black. There are two main divisions, the Eastern or Oceanic [PAPUANS], and the Western or Continental, *i.e.* the Negroes proper of the African continent. Here also there are two main divisions, the Southern [BANTU] and the Central of Sudan, *i.e.* Bilad-es-Sudan, "Land of the Blacks," Negritia, Negroland, to which the typical African Negro is mainly confined. Even in this region, which ethnologically includes Upper Guinea, the White Nile, Welle, and Shari basins, the black aborigines have been largely encroached upon, mainly by the Berber and Galla Hamites, and the Arab Semites, with whom extensive interminglings have taken place. Hence many of the Sudanese populations who pass for Negroes are really Negroid, showing all the shades of transition between the true Negro and the Caucasian Hamites and Semites. Such especially are the Fulahs of west Sudan, not originally Negroes at all [FULAHs], the Hausas and Kanuri of central Sudan, the Mabas of Waday, the Furs of Dar-Fur, the Nubians of the Nile Valley, and many branches of the historical Sonrhay and Mandingau peoples. In general, wherever Mohammedan culture has been of long standing, miscegenation may always be suspected, and may be said to coincide with the prevalence of costume properly so-called, and of stone structures, for the true Negro never goes clothed, as do the Moslem Mandingaus and Kanuri, and never raises stone buildings, such as those of Timbuktu, Kano, Katsena, and other Sonrhay and Hausa cities. With these reservations the Negro race proper will be found mainly confined to the western seaboard from the Senegal to the Niger delta, to a large part of the region enclosed by the great northern bend of the Niger; to the Upper Nile basin between the Sobat confluence and Albert Nyanza; to nearly the whole of the Welle-Ubanghi basin, to the regions about the Congo, Chad, and Nilo-Congo water-partings, and generally throughout South Sudan from the Niger delta eastwards to Dar-Fertit, Sennar, and South Kordofan.

In all these lands the Negro type proper is found either exclusively or amongst the immense majority of the natives. Its chief characteristics are—dolichocephalic (*i.e.* long narrow head), with some important exceptions in the Nile and Welle basins where the Bongos, Zandebs [NIAM-NIAM], and others have round heads; black, woolly hair, mostly rather long, flat in transverse section, and distributed evenly over the scalp; scant or no beard; smooth, silky, and very dark brown skin, black or almost black amongst the Wolofs of Senegambia, the Nubas of Kordofan, the Nilotic

Shilluks, and a few other groups; broad, flat nose; prominent cheekbones; thick, everted lips showing the red inner skin in marked contrast to the white teeth; large, black, round and prominent eye, with yellowish cornea, co-ordinate with a distinct yellowish tinge on the palms and soles; "larkspur" heels; large, massive, and even herculean frames, with thick skulls, but weak legs and long arms. But perhaps the most important physiological trait is the early closing of the cranial sutures, apparently arresting mental development, so that while Negro children are intellectually little inferior to others, the Negro adult remains throughout life little more than a child. He is cheerful and boisterous in his mirth, but thoughtless, improvident, and fitful, passing suddenly from comedy to tragedy, being at once affectionate and cruel, and also sensuous, the animal side being developed at the expense of the intellectual. For the same reason he is essentially unprogressive, making no spontaneous advance beyond the simple arts of coarse weaving and dyeing, iron- and copper-smelting, metal-working, wood-carving, and agriculture. Some, such as the Yorubas and Mangbattus, build spacious and elegant houses and assembly halls, but always of wood and earth, so that architecture, such as it is, remains stationary, as does all negro culture left to itself. Science, the fine arts, and letters are absolutely non-existent, and no Negro people have ever developed any kind of literature, or even reduced their language to written form. All Negro writings, without exception (the "alphabet" attributed to a member of the Vei tribe, Senegambia, is spurious), are the work of other peoples, chiefly Christian and Mohammedan missionaries, and when these retire the community invariably lapses to the normal low level of Negro culture. Nearly all traces of the foreign cults rapidly disappear, and non-theistic nature- or demon-worship resumes its sway, with its attendant fetishism and all the horrors associated with the universal belief in witchcraft.

Negroland presents in the immense diversity of its native idioms the sharpest contrast to Bantuland, where all known tongues are little more than dialects of two primitive stock languages, Bantu and Hottentot. In Sudan, on the contrary, the stock languages are reckoned by the score, and many, no doubt, still remain to be discovered in the almost unknown regions about the Congo-Chad water-parting and in Adamawa. In their structure they also differ from the languages of the southern group, the relational elements being mainly post-fixes, whereas in the Bantu system they are mostly prefixes. As far as they are known, the chief Sudanese linguistic families (stock languages) appear to be: *Mandingan*, with innumerable dialects widespread throughout west Sudan; *Fulah*, west and central Sudan; *Wolof* and *Serer*, between the Lower Senegal river and Cape Verd; *Bagnum*, *Felup*, *Nalu*, *Numba*, between Cape Verd and Sierra Leone; *Tinni*, *Bulom*, *Mendi*, *Gallina*, in Sierra Leone; *Pessi*, *Gola*, *Kru*, *Arikom*, *Agni*, Liberia and Ivory Coast; *Tshi*, *Ga*, *Ewe*, and *Yoruba*, Gold and Slave Coasts; *Igarra*, *Ibo*, *Okrika*, *Efik*, *Nupur*, Lower Niger, Niger delta, and Oil rivers;

Kissi, *Sonrhay*, Upper Niger; *Mosso*, *Gurma*, *Gurunga*, *Borgu*, within the Niger bend; *Hausa*, *Kanuri*, central Sudan; *Baghirni*, *Sara*, *Mosgu*, *Yedina*, *Kuri*, Lake Chad and Shari river; *Maba*, *Massalit*, *Kondonga*, *Fur*, *Nuba*, *Tegele*, east Sudan and Nubia; *Shuli*, *Bari*, *Dinka*, *Shilluk*, *Bongo*, *Fajelu*, *Janghey*, *Fallanj*, *Luri*, *Madi*, Upper Nile and Sobat basins; *Mangbattu* (*Mombuttu*), *A-Zandeh* (*Niam-Niam*), *A-Madi*, *Momfu*, *A-Barnbo*, *A-Babua*, *Nsakhara*, Welle basin.

Negus, a beverage concocted of port or sherry and hot water, sweetened with sugar and flavoured with spices and lemon-peel. It obtained its name from Colonel Francis Negus (d. 1732), who is said to have recommended the compound in order to qualify the ardour with which some Whigs and Tories were discussing politics in their cups. Littré defined it as "limonade au vin."

Nehemiah, the Jewish cup-bearer of Artaxerxes Longimanus, King of Babylon, heard at Susa in 445 B.C. of the sad state of Jerusalem, and the next year obtained leave to go there as governor. He built up the walls, brought in the population, especially the Levites, and instituted the Feast of Dedication. He paid a second visit twelve years later and instituted many reforms, chiefly in the direction of keeping the race distinct and the observation of the Sabbath. These reforms probably caused the secession of the Samaritans. The book of *Nehemiah* forms a series with *Ezra* and *Chronicles*, but it is difficult to arrange the events narrated in their due order.

Neilgherry Hills (Sanskrit, "Blue Mountains"), near the Malabar Coast of South India. They rise abruptly from the plains in an isolated mass, which is united with the Western Ghats by a granite ridge. Their average height is 6,000 feet, and the greatest 8,760. The lower slopes are thickly wooded, and among the grassy uplands are many forest trees. They are the home of five tribes, of whom the Todas, few in number, are the most interesting. These people are tall and powerful, speak a Dravidian dialect, practise polyandry, and are occupied chiefly in tending cattle. The climate is cool, and the hills form a health-resort for Ootacamund.

Neill, JAMES GEORGE SMITH, brigadier-general, was born near Ayr, Scotland, on May 27th, 1810, and educated at Ayr Academy and Glasgow University. Entering the army, he arrived at Madras in 1827, and put in several years' service before he saw any fighting, in the second Burmese war (1852). Invalided home, he was placed second in command of the Turkish Contingent in the Crimean war. The outbreak of the Indian Mutiny (1857) gave him a longed-for opportunity, and he was appointed brigadier-general in command of the Hyderabad Contingent. He saved Allahabad and followed Sir Henry Havelock to Cawnpore. Here he punished with stern severity as many as he could find of the rebels who were responsible for the atrocious massacre at the well. Havelock, meanwhile, had proceeded to the relief of Lucknow, but his force

was inadequate and he had to retire on Cawnpore, where the mutineers still threatened trouble. Though serious friction had arisen between Neill and Havelock, the former was given the command of the right wing in the advance on Lucknow. From the 21st of September, when the relief army got in touch with the enemy, till the 25th there was incessant fighting, and Neill led his men wherever the battle was hottest. On the evening of the 25th Neill had reached the outskirts of Lucknow, when he was greeted with a hail of bullets at the Kaisar Bagh, one of which killed him on the spot. He was buried next day. The posthumous honour of K.C.B. was awarded him.

Neilson, JAMES BEAUMONT, inventor of the hot blast in the iron manufacture, was born, of humble parentage, at Shettleston, near Glasgow, on June 22nd, 1792. After serving his time as a mechanic he became an engine-wright at a colliery at Irvine and, in 1817, foreman and, five years later, manager of the gasworks in Glasgow, where he effected several valuable improvements in the process of gas-making. Curious to ascertain why the blast furnaces turned out more and better iron in winter than in summer, he instituted experiments which ended in the discovery of the advantages of the hot over the cold blast. Like most inventors, he had to undertake many costly lawsuits in protection of his patents, but was able to retire from the gasworks in 1847 and to spend the rest of his life on his estate in Kirkeudbrightshire. He died at Queenshill, in the parish of Tongland in this county, on January 18th, 1865.

Neisse, a town of Silesia, Prussia, on the Neisse, 30 miles S.W. of Oppeln. It has manufactures of lace, blankets, linen, chemicals, arms and machinery. It was once the residence of a prince bishop, whose house now forms the municipal buildings. There is a monument to the poet Joseph Eichendorff (b. 1788), who died here in 1857. Pop., (1900), 24,267.

Nélaton, AUGUSTE, one of the most famous of French surgeons, was born in Paris on June 18th, 1807. He studied medicine in Paris and became house-surgeon in 1831. He took his degree of Doctor of Medicine in 1836, and was elected Fellow of the Faculty and appointed Surgeon of the Hospitals in 1839. He became Professor of Clinical Surgery in 1851, Member of the Academy of Medicine in 1863, and a Member of the Institute in 1867. Nélaton died in Paris on September 21st, 1873. He was one of the first operators of his time and acquired, through constant research, a remarkable correctness of diagnosis. As a professor, he possessed a unique gift of explaining and demonstrating an operation. He was especially successful in the operations of rhinoplasty, in the extermination of tumours of the groin and in intestinal obstruction. He was consulted by the Italian surgeons in the case of Garibaldi when wounded at Aspromonte. He differed from them in believing that the bullet was still in the wound, and by means of a porcelain-pointed probe which he sent from Paris, his surmise was proved to be

correct. He was the author of many valuable works, of which the following are the most important:—*Contraction in certain cases of Hip-disease in Children* (1835); *Tumours of the Breast* (1839); *Surgical Pathology* (1844-60); *Clinical Lectures on Surgery* (1851-3); *Report on the Progress of Surgery in France* (1867).

Nellore, a district of Madras Presidency, on the Coromandel coast, India. It occupies an area of 8,739 square miles. Large parts of it are rocky waste or dense jungle, but in the west a range of hills rises to peaks 3,000 feet above the sea. The Penner is the principal stream. The chief crops are millet, rice, indigo and oil-seeds. The industries include cotton-weaving and spinning, the fabrication of metal vessels, mat-making and boat-building, but none is of much importance. The district is famous for its cattle, the farmers having taken up cattle-breeding, owing to the difficulties of agriculture. Pop. (1901), 1,497,796. NELLORE, the capital, lies on the Penner, 100 miles N. by W. of Madras City. Pop. (1901), 32,040.

Nelson, a town of Lancashire, England, 3 miles N. of Burnley. It has large cotton manufactures and coal mines, and possesses a market-hall and free library and technical school. Pop. (1901), 32,816.

Nelson, a town in the district of Nelson, New Zealand, situated in Tasman or Blind Bay, an arm of the sea in the north of South Island. It has a fine harbour and is a handsome, well-constructed town, dating from 1841. It is the seat of an Anglican bishop, and among the chief buildings are the cathedral, museum and art gallery. The manufactures include cloth, leather, soap and preserves, and there is a brisk shipping trade. Pop. (1909), 8,650 (town), 45,700 (district.).

Nelson, HORATIO, VISCOUNT NELSON, admiral, was born at Burnham Thorpe, Norfolk, England, on September 29th, 1758, and was educated at the high school of Norwich and at a school at North Walsham. In 1770 he left North Walsham to join the navy. In 1773 he volunteered to accompany an Arctic expedition which was undertaken at the request of the Royal Society. On his return in October he, during a cruise to the East Indies, was rated a midshipman. His subsequent career may be thus summarised: 1777 promoted to be lieutenant; 1778 promoted to be commander; 1779 posted; 1780 naval commander of the expedition which reduced Fort Juan, Nicaragua; 1787 married Mrs. Nisbet, a young widow residing in the island of Nevis; 1788 settled at Burnham Thorpe for four years; 1793 appointed captain of the *Agamemnon*, serving at the sieges of Bastia and Calvi, where (1794) he lost his right eye; 1796 commodore; 1797 present at the battle of St. Vincent, promoted to be rear-admiral; attacked Santa Cruz (Teneriffe) where he lost his right arm by a cannon shot; 1798 won the battle of the Nile, taking or destroying eleven ships and two frigates, and created a peer; made a vice-

admiral 1799 at Naples, where his passion for Lady Hamilton compromised him; 1880 returned to England with the Hamiltons; 1801 separated from his wife; in command of a detached squadron, won the battle of Copenhagen, taking or destroying fifteen Danish ships of war; left in supreme command in the Baltic, but was obliged to return to England on account of ill-health; 1803 was appointed to the chief command in the Mediterranean; 1805 assumed the command off Cadiz, where the



LORD NELSON.

(From the painting by Sir William Beechey, R.A.)

allied French and Spaniards lay; October 21, 1805, perished gloriously at the battle of Trafalgar. His body was brought to England in the *Victory* and, after lying in state in the Painted Hall, Greenwich Hospital, was on January 9, 1806, buried in the crypt of St. Paul's Cathedral.

Nelson. ROBERT, religious writer, was born in London on June 22nd, 1656. He attended St. Paul's School, but when his mother removed to Dryfield, Gloucestershire, he was educated by Dr. George Bull, afterwards Bishop of St. David's. In 1680 he became a member of the Royal Society, and made a long tour in France and Italy with Halley. In 1683 he married, and the state of his wife's health caused him to be absent in Italy when the Revolution took place. In 1691 he became a Nonjuror, but joined the Established Church in 1710. He worked on behalf of the Society for promoting Christian Knowledge and the Society for the Propagation of the Gospel, and among his devotional writings *Fasts and Festivals* (1704) is well known. He also wrote a *Life of Dr. George Bull* (1713) and died at Kensington on January 16th, 1714-15.

Nelumbo, a genus of aquatic plants classed by some botanists with the order Nymphaeaceae, and by others formed into the separate order Nelumbineae. They occur in tropical and sub-tropical countries of Africa, Asia and North America. The flowers, usually *couleur de rose* and rarely white, resemble water-lilies in appearance. *N. speciosum*, the Pythagorean or Egyptian bean and the lotus of the Hindus, was looked upon by the ancients as a symbol of fecundity, Egyptians, Hindus, Tibetans, and Chinese alike investing it with more or less sacred significance. Its root yields a kind of arrowroot and, pickled, is eaten with rice. The flowers of the American *N. luteum*, the water chinkapin, are from five to ten inches broad, and have yellow papery petals. It is common in the southern states of the Union.

Nematodea, a class of Vermes, generally parasitic, with a mouth and alimentary canal. The sexes are separate; it includes the thread-worms, round-worms, trichinidae, etc.

Nemertina, a class of the group Vermes, popularly styled "worms." It has proved very difficult to assign them an absolutely indisputable position in the animal kingdom and, in despair, some zoologists have felt disposed to give them a group to themselves. They are mostly marine in habit, being found in sand or mud, though some are swimmers. They are flat, covered with hairs—hence they have been included in the Polychaeta order of worms—and often brightly coloured. Some of them attain to an enormous length, *lineus marinus* or *longissimus* being 12 or 15 feet long, and half an inch or so broad. They break easily, and some of the segments form new heads. Amongst their remarkable characters are the proboscis which lies in a sheath along the back, is protrusible, and is probably a weapon of offence and, on the side of the head, slits whose function has not yet been definitely ascertained. Bürger divides them into four orders.

Nemesis (from Greek *nemo*, "I distribute"), the Greek goddess who distributed good and ill fortune, worshipped at Rhamnus, in Attica, and elsewhere. The Greeks' notion of proportion led them to believe that a constant balance is maintained in human affairs, and that, however diverse the lives of nations and individuals may appear, the amount of good and bad fortune in each is always equalised in the long run. Thus an unwonted excess of prosperity is sure to be followed by a corresponding period of depression and ill luck. This notion became blended with the conception of Zeus as a jealous deity ever ready to punish the arrogance which springs from excessive good fortune. Hence Nemesis was regarded as the impersonation of stern retributive justice.

Nemophila, a genus of annual plants belonging to the small gamopetalous order Hydrophyllaceae, with pinnately-lobed leaves and conspicuous flowers which are polysymmetric and have their parts in fives, except the carpels, which are two in number. Several species are grown in gardens,

the best known being *N. insignis*, a native of California, bearing a clear blue flower with a white centre.

Nemours, a town in the department of Seine-et-Marne, France, on the Loing, 45 miles S. by E. of Paris. It has tile-works, tanneries, and sandstone quarries. Created a duchy in 1404 for Charles III., King of Navarre, it repeatedly returned to the French Crown till, in 1672, it became the heritage of the Orleans family. The mathematician Étienne Bézout (1730-83) was a native of Nemours, the name of which is said to be derived from the groves (Latin, *nemora*) amidst which the town once stood. Pop. (1901), 4,861.

Nennius, the name adopted by the author of *Historia Britonum*, a work which gives a mythical account of the Britons, the coming of the Romans, Vortigern and the Saxons, and the 12 victories of King Arthur. The work is not of great value except for fragments of earlier authors embodied in it, and the authorship is sometimes attributed to Gildas or some person unknown. The original was probably in ancient Welsh.

Neocomian, from *Neocomum*, the Roman name of Neuchâtel, in Switzerland, is the name applied to the lower division of the Cretaceous system, it being well developed in that district. It is there represented by several hundred feet of marls and massive limestones, the latter including the *Caprotinenkalk*, containing *Caprotina* and other *Hippuritidae*, the *Bryozoenkalk*, containing polyzoa, and the *Orbitolitenkalk*, containing foraminifera. These are all marine; but in England the series is represented by two distinct types of strata, one marine, and the other partly estuarine. The former is represented by the upper part of the Speeton Clay on the Yorkshire coast, and by the variable Tealby series in Lincolnshire. Besides ammonites, characteristic of zones throughout the marine beds, the Middle Neocomian, including the Tealby beds, is characterised by the large scallop *Pecten cinctus*; and the Upper by the large oyster *Exogyra sinuata* and by *Perna Mulletii*. In the southern counties of England the fresh-water Hastings Sands correspond apparently to the Lower, and the Weald Clay to the Middle Neocomian, whilst conformably above this, and corresponding to the Upper Neocomian, come the marine beds of the Lower Greensand. [GREENSAND.] Neocomian rocks generally graduate conformably downwards into the Jurassic; but are, sometimes at least, separated from the Upper Cretaceous by an unconformity.

Neolithic, the later Stone Age. It forms the ill-defined division of the prehistoric part of the Human period, when man was no longer associated with many extinct mammals; when he used polished, and not merely chipped, stone implements; when he began to domesticate certain animals, to cultivate certain plants, to spin, to weave, and to make pottery. The history of this period is gathered from low-level gravels, cave deposits, peat-mosses, kitchen-middens, and especially from the Swiss lake-dwellings, and their

evidence suggests the migration of a small, long-headed and probably Mongoloid race from Asia, bringing with them the dog, sheep, goat, and short-horn, and perhaps the domestic pig. They may also have brought jade from Asia, and seem to have practised a sort of intertribal barter. The mammoth and woolly rhinoceros were perhaps already extinct in Europe; but Neolithic man probably exterminated the great Irish deer (*Cervus megaceros*), and was associated in Europe with the reindeer, the urus, and the grizzly bear, as well as the still existing beaver, brown bear, and wolf. The great shell mounds (kitchen-middens) of Denmark, 3 to 10 feet high and sometimes 1,000 feet long, belong mostly to this period, as do also the lower peat-mosses of that country, in which the Scots fir (*Pinus sylvestris*) is the prevalent wood. [FLINT IMPLEMENTS.]

Neophyte (from the Greek, meaning "newly planted"), a term applied to the newly baptised. The rights of admission enjoined the kiss of peace; the carrying of lights; partaking of honey and milk after immersion; the delivery of a white garment which, after being worn for eight days, was kept in the church as witness against anyone who might dishonour his profession. The rites of the Eastern and Western Churches differed in many ways, and in neither communion does uniformity appear to have prevailed. The Emperor Constantine, delaying his baptism until near his end, A.D. 337, died in the robe of a neophyte, refusing thereafter to resume the imperial purple.

Neo-Platonism was the final outcome of Greek philosophy and religion, with an admixture of Oriental features. Greek philosophy, after reaching its full development in the systems of Plato and Aristotle, gradually declined. Amidst the decay of ancient civilisation, which forced the individual back upon himself, the satisfaction of man's spiritual needs became the object of the schools rather than the explanation of the physical or intelligible world, and intellectual vigour gave place to religious sentiment. Neo-Platonism represents the last stage in this process, and it was also the latest attempt to reconcile the rites and doctrines of different religious and philosophical systems. The founder of Neo-Platonism proper is said to have been Ammonius Saccas, who lived at Alexandria in the first half of the 3rd Christian century. The first and most eminent writer of the school was Plotinus. Under his successors Porphyry (233-303) and Iamblichus (d. 330) the tendency to polytheism and superstition became more marked; and, in spite of the efforts of the Emperor Julian, who strove to make Neo-Platonism a world-religion which should be a rallying-point for the expiring energies of Paganism, it was unable to cope with the growing power of Christianity. The return to a higher and purer form of Neo-Platonism at Alexandria in the early part of the 5th century was brought to a close by the tumult which led to the murder of Hypatia. At Athens the school lingered on, even displaying fresh energy under Proclus, who reduced the teaching of all his predecessors to a complete system;

but 44 years after his death the Athenian school was closed by Justinian (529). Through the works of Dionysius, the Areopagite, Neo-Platonic doctrines were handed on to the Middle Ages and became the source of Christian Mysticism.

Neoscorpia, a sub-order of scorpions, including those in which the median eye-tubercles are some distance from the anterior margin and behind the lateral eyes.

Nepal, or **NEPAUL**, an independent kingdom in the mountainous country on the extreme north of India, bounded on the north by Tibet, on the east by Sikkim, on the south and west by British India. It occupies the southern slopes of the Himalaya, with a trend from north-west to south-east, is 512 miles long, has a breadth varying from 70 to 150 miles, and covers an area of 54,000 square miles. Its loftiest summits are Mount Everest (29,002 ft.), Kanchanjanga (28,156 ft.), and Diwalagiri (26,826 ft.). The Gogra, Gandak, Kusi, and other tributaries of the Ganges take their rise in the Himalaya. Along the base of the hills, in some places thickly wooded, is the track of the *terai*, the haunt of the tiger, leopard, and rhinoceros. Rice, wheat, maize, sugar-cane, spices, fruits, tobacco, opium, all grow in the more favoured districts. Copper, iron, sulphur, marble and crystal occur. The chief manufactures are cloth, iron, copper, and brass vessels, and bell-metal, and there is a brisk commerce with Tibet and British India. Among the articles exported are rice, oil-seeds, opium, musks, falcons, furs, ginger, yaks' tails, etc. The people are of Mongolian type, the upper classes being Hindu in religion and the lower Buddhists. Nepal was invaded by Hindus in the 14th century, and by Goorkhas in 1767. A war with Great Britain in 1814 led to a treaty in 1816, and friendly relations have since been established and maintained. The capital is Katmandu, a very important emporium, since it lies on the chief route of both internal and external trade. Population of Nepal estimated at about 5,000,000.

Nepenthes. [PITCHER-PLANTS.]

Nepheline, a mineral silicate of alumina, soda, and potash, crystallising in hexagonal prisms, generally clear, colourless, and glassy, but small. Its hardness is 5.5 to 6; its specific gravity 2.5 to 2.6. It derives its name from the Greek *nephelē*, "a cloud," because it becomes cloudy on immersion in nitric acid before relatinising. It is fusible. Nepheline is an essential constituent of phonolite, and occurs also in other lavas.

Nephritis. [BRIGHT'S DISEASE.]

Nepomuk, St. JOHN OF, the patron saint of Bohemia, so-called from the name of his birth-place—Nepomuk, 15 miles S.S.E. of Pilsen—flourished in the 14th century. Educated at Prague University he acquired great repute as a preacher, but incurred the anger of King Wenceslaus IV. for declining to divulge the queen's confession. By the monarch's orders the priest was drowned in the Moldau in 1383. He lived in the

people's memory, and was canonised by Pope Benedict XIII. in 1729. Attempts have been made to discredit the episode.

Nepos, CORNELIUS, a Roman historian of the 1st century before Christ, was a native of Verona. He died some year between 30 and 20 B.C. Little is known of his life but that he was a friend of Cicero and Catullus. The only extant work of Nepos is a fragment of his *De Viris Illustribus*, and even of this his authorship has been disputed.

Nepotism (Latin, *nepos*, "nephew"), a term signifying the custom of the popes, subsequent to Innocent VIII., of bestowing dignities and emoluments upon their kinsmen, frequently their nephews, without adequate, or indeed any, consideration of their fitness for the post or the honour. Pope Innocent XII., immediately after his election in 1691, protested against what had become a gross scandal in connection with the papacy, and in the following year issued a Bull, which prohibited his successors from continuing the abuse. But it is not to Church matters only that nepotism is confined, and during the period when the purchase system prevailed in the British army, the practice seriously impaired the efficiency of the force. The "Take care of Dowd" incident in the Crimean War was only a flagrant case that happened to be made public.

Neptune (NEPTUNUS), the Roman God of the sea, is identical with the Greek Poseidon. The name is supposed to be a contraction of "Navitunus," connected with the Greek *naiein* (Latin, *natare*), "to swim." Neptune was the brother of Jupiter and Pluto, and was always offered a sacrifice (which was afterwards thrown into the sea) at the outset of any naval expedition. His temple was in the Campus Martius, Rome, and his festival was kept on July 23.

Neptune is that planet in the solar system which is farthest from the sun, the distance between the two bodies being about 2,750,000,000 miles. At this immense distance it will, according to Kepler's laws, take a long time to travel once round its orbit, and this time has been found to be 165 of our years. Although it is four times the diameter of the earth, yet, on account of its enormous distance from us, it can only just be seen, even with a tolerably powerful telescope. Until the middle of the 19th century Neptune was believed to be a star, but in 1845 Adams and Le Verrier considered that a variation in the motion of the planet Uranus must be due to an undiscovered planet. From the disturbance of Uranus they were able to calculate the size and position of this new planet, and from their data Galle was led to its actual discovery by the telescope. Lassell has found that Neptune possesses one satellite, which moves round the planet in rather less than six days and is 222,000 miles away from it. No appearances in Neptune have enabled astronomers to calculate its rotation about its own axis, but it is extremely probable that it does rotate and that this motion is in the same direction as its motion round the sun.

Nerbudda, or **NARBADA**, a river of India, rising in the hill of Amarkantak (3,493 feet above the sea) and, pursuing a westerly by south-westerly direction between the Satpura range, on the south, and the Vindhya mountains on the north, reaching the sea at Broach on the Gulf of Cambay, after a run of 800 miles. The course is interrupted by too many rapids, falls and shallows to be navigable for more than 30 miles from its mouth. The stream is second only to the Ganges in respect of sanctity, and the most meritorious deed that a pilgrim can perform is to walk by one bank from the sea to the source and return by the other. Traditionally, the river is considered as the boundary between Hindustan proper and the Deccan.

Nereid. [NYMPH.]

Neri, **ST. FILIPPO DI**, founder of the Oratorians, was born of noble parents at Florence, on July 21st, 1515. Having studied at Rome, he was ordained to the priesthood in 1551, and soon became famous for his piety and his charitable deeds. He also took a leading part in the internal reformation which was begun in the Roman Church almost at the same time as the external movement. The congregation of the Oratory was founded by him in 1564, and approved by the Pope in 1577. Neri died in Rome on May 26th, 1595, and was canonised by Gregory XV. in 1622. [ORATORY.]

Nero, **EMPEROR OF ROME**, was the son of Cneius Domitius Ahenobarbus and Agrippina, daughter of Germanicus. He was born at Antium, the modern Porto d'Anzio, on the west coast of Italy, about 30 miles S. of the Tiber, on December 15th, 37, and adopted when he was thirteen by the Emperor Claudius, whose daughter Octavia became his wife soon afterwards. In spite of the fact that Claudius had a son, Nero was proclaimed emperor on the death of the latter in 54. His reign, which lasted for fourteen years, was marked by the subjugation of Armenia, by revolts of the Jews, and by the rising of Boadicea, in Britain. Nero poisoned Britannicus, son of Claudius, had his mother Agrippina assassinated, and then banished and put to death his wife Octavia, whom he had divorced in order to marry his mistress Poppæa. The latter he killed and then married Statilia Messalina, after Antonia, daughter of Claudius, had been put to death for rejecting his proposals. Seneca, Lucan, Corbulo, and Pætus Thrasea were also amongst his victims. Many Christians were put to death on account of the fire at Rome in 64, the planning of which, however, Suetonius and Dion attribute to Nero himself. In 68 risings took place in Spain and Gaul, and Nero, being deserted by the troops at Rome, put an end to his life on June 9th, 68. The last words of the vain brute were, "What an artist is lost in me!"

Nerva, **MARCUS COCCEIUS**, Emperor of Rome, was born, probably at Narnia (the modern Narni), 45 miles N.E. of Rome, in 32. On the assassination of Domitian in 96, he was declared emperor. In the course of his short reign of two years he put

down the prevailing systems of perjured informations, reduced the public expenditure, and distributed land among the poorer citizens. Nerva died suddenly on January 27th, 98, having adopted Trajan as his successor.

Nerval, **GÉRARD DE**, *nom de guerre* of **GÉRARD LABRUNIE**, dramatist, novelist and poet, who was born in Paris, on May 22nd, 1808, and educated at the collège Charlemagne. His first work was a translation of *Faust*. He afterwards travelled in Europe, Egypt, and Western Asia, and lived a stormy and dissipated life, the end of which was probably suicide, for he was found dead, hanging from a railing in a street in Paris, on January 25th, 1855. To literature he contributed exquisite short stories, *Contes et Fécéties, etc.*, *La Bohème Galante*, some poems, *Filles du Feu*, and *Aurélia, ou le Rêve et la Vie*. In 1852 he also published *Les Illuminés, ou les Précurseurs du Socialisme*, and he wrote several plays.

Nerve. Nervous tissue is made up of nerve-fibres and nerve-cells. The latter are found in certain situations in the central nervous system, and are also met with in the ganglionic enlargements which occur in the course of some nerve-trunks. The nerve-fibres are bound together in groups forming nerves, and these serve for the transmission of nervous impulses and for intercommunication between peripheral nerve terminations and the nerve-centres in the brain and spinal cord. If a section is made of a nerve-trunk, the appearance presented is that depicted in Fig. 2. A number of nerve-bundles are seen cut across, each containing a multitude of nerve-fibres held together by connective tissue. Each bundle is surrounded by a connective tissue sheath, and the several bundles are held together by a further interlacement of connective tissue fibres.

An individual nerve-fibre can be studied by isolating it from surrounding fibres, a procedure which can be effected by tearing a minute piece of nerve with needles so as to split it up and separate the individual fibres one from another. It will be found that nerve-fibres are of two kinds—medullated or white fibres, and non-medullated or grey fibres. Medullated fibres consist of three parts, an outer sheath (the neurilemma), enclosing the fibre and presenting here and there on its inner surface a nucleus, an internally situated axis cylinder, and an intermediate substance of a fatty nature, known as the white substance of Schwann, or medullary sheath. The axis cylinder is the portion of the nerve-fibre which conducts nervous impulses, the other parts of the fibre serving merely for protection and insulation. The axis cylinder is made up of a number of minute fibrillæ,

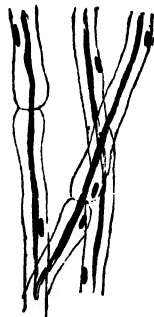


FIG. 1.—NERVE-FIBRES SHOWING THE AXIS CYLINDER, NODES OF RANVIER, AND NUCLEI LYING BENEATH THE NEURILEMMA.

and at its terminations a nerve loses its medullary sheath and the cylinder becomes split up, the component fibrillae ramifying and forming a network, whether it be at the peripheral termination of the nerve, or at the point where the nerve breaks up in the central nervous system.

Non-medullated fibres are found in the trunks of cerebro-spinal nerves mingled with the medullated fibres, and they constitute the sole variety of fibre met with in the olfactory and auditory nerves and in the nerves of the sympathetic system. These non-medullated fibres possess no white substance of Schwann and thus resemble the terminal portion of the ordinary medullated nerve-fibre. The medullary sheath is not continuous throughout the length of an ordinary nerve-fibre, but is interrupted from place to place, a constriction being present at such points of interruption, and these points are termed nodes of Ranvier (Fig. 1). The other constituent of nervous tissue which has been alluded to, the ganglion cell, is a cell enveloped in a capsule, possessing a nucleus and one or more processes; the cell is said to be unipolar, bipolar, or multipolar, according to the number of processes which radiate from it. In certain situations—notably in the

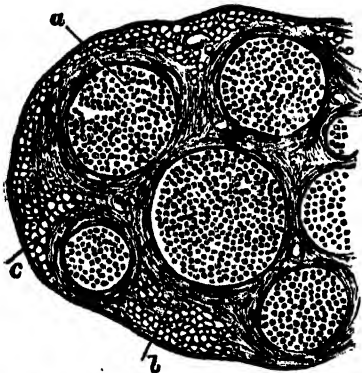


FIG. 2.—TRANSVERSE SECTION OF A NERVE-TRUNK.

a, nerve-bundle; b, connective tissue sheath of same; c, fat cells.

anterior horns of the grey matter of the spinal cord—a process of a ganglion cell has been traced and shown to be continued as the axis cylinder of a nerve-fibre. Thus in some instances axis cylinders originate directly from ganglion cells. In other cases an axis cylinder takes origin by the collection of fibrillae from the network in the nerve-centre, such fibrillae being grouped together and so forming the central core of the fibre.

The peripheral termination of a nerve may consist in a mere splitting-up of the axis cylinder into fibrillae, this arrangement being well seen in the cornea; or a nerve termination of some complexity of structure may be met with. Examples of such peripheral nerve-endings are the Pacinian corpuscles, which occur in the palm of the hand and sole of the foot in man and in the mesentery of the

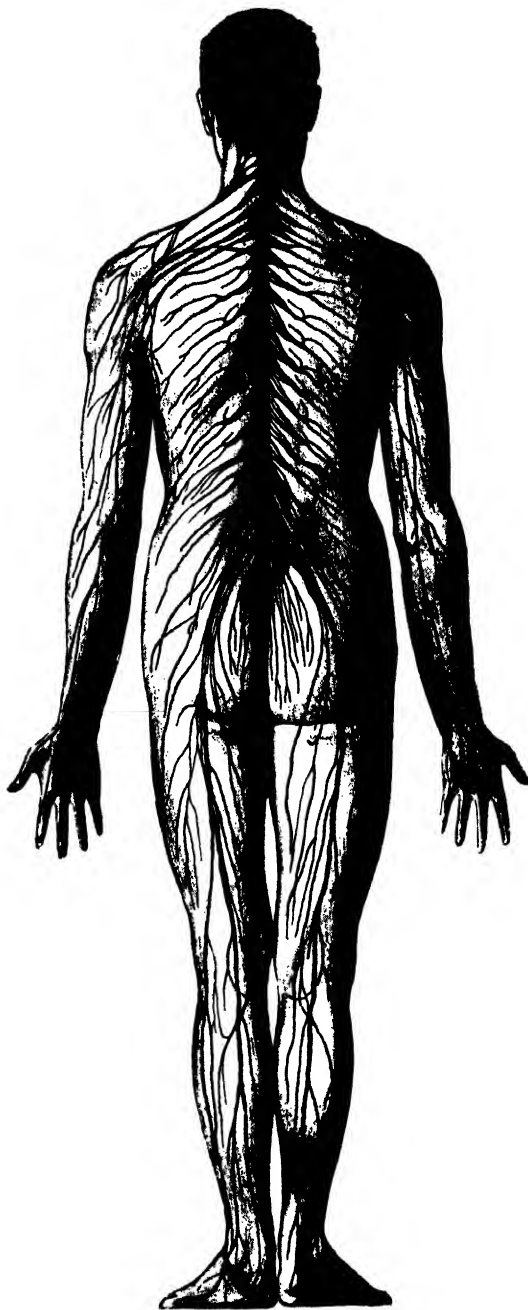
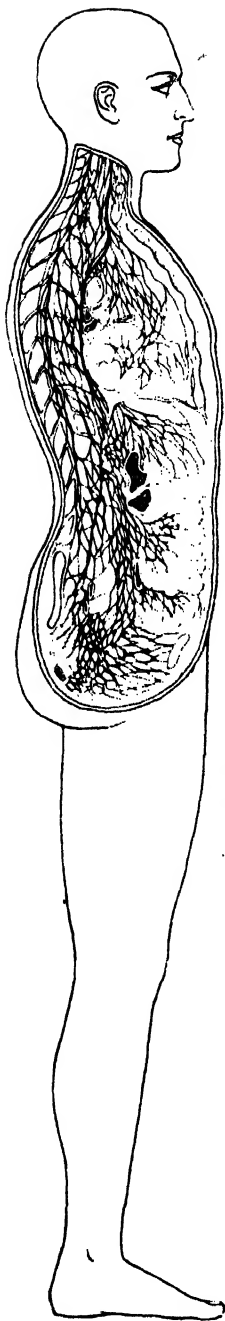
cat, the nearly allied corpuscles of Herbst and of Meissner, etc., and the peculiar nerve end-plates which are met with at the ultimate termination of the axis cylinders of striped muscle.

The functions of nerves are various. Some conduct impulses from a nerve-centre to the periphery; these are called efferent nerves, *e.g.* the nerves supplying muscle, nerves which regulate the calibre of blood-vessels, nerves which influence secretions. Nerves which conduct impulses from the periphery towards the centre are called afferent nerves; such are the nerves of ordinary sensation, of special sense, and of what is known as muscular sense. The rate at which impulses are transmitted by nerves has been carefully investigated, and it has been shown to be rather more than 100 feet per second in the motor nerves of man. In the case of nerves originating from the spinal cord, it is found that each trunk is connected with the cord by two bundles—the anterior and posterior roots. Near the junction of these and situated on the posterior root, is a ganglionic enlargement. It has been demonstrated experimentally that the anterior root of a spinal nerve is concerned in transmitting impulses from the centre to the periphery (efferent impulses), while the posterior root transmits impulses in the reverse direction (afferent impulses).

The various nerve-trunks belong to one of two systems, the cerebro-spinal and sympathetic systems. The cerebro-spinal nerves consist of the 12 pairs of cranial nerves taking origin from the base of the brain, and of the spinal nerves, 31 pairs in all, which originate from the spinal cord, and which are termed according to the part of the cord from which they emanate, cervical (eight pairs), dorsal (twelve pairs), lumbar (five pairs), sacral (five pairs), coccygeal (one pair). The first pair of cranial nerves are the olfactory nerves, and the second the optic nerves. The third, fourth, and sixth pairs are concerned with the movements of the muscles of the eye. The fifth pair are mainly sensory and distributed to the face, but each gives off a branch which innervates the muscles of mastication. The seventh pair are concerned with the movements of the facial muscles. The eighth pair are the auditory nerves; the ninth pair, known as glossopharyngeal nerves, are the nerves of taste; the tenth pair, the pneumogastric or vagus nerves, have a wide distribution, supplying the heart, lungs, and stomach; the eleventh pair are the spinal accessory nerves, and the twelfth, the hypoglossal nerves, supply the muscles of the tongue.

The spinal nerves, shortly after their taking origin from the cord, communicate with one another, forming what are known as plexuses. Such are the brachial plexus, formed by the lower cervical and first dorsal nerves, and the lumbar and sacral plexuses.

The sympathetic system of nerves takes origin from two main chains, situated on either side of the spinal column. In connection with these chains are a number of ganglionic enlargements, the sympathetic ganglia. Three such ganglia occur in the neck, the superior, middle, and inferior



cervical ganglia, and a number of other ganglia are met with in the thorax. From the thoracic portion of the sympathetic system arise the three splanchnic nerves, which pass downwards to innervate the abdominal viscera. In relation with the sympathetic system of nerves are found a number of plexuses, *e.g.*, the cardiac plexuses, the great solar plexus, situated in the upper part of the abdomen, with which are connected a number of subsidiary plexuses, and finally the hypogastric and pelvic plexuses.

Ness, Loch, a freshwater lake of Inverness-shire, Scotland, stretching in a north-easterly direction, the upper end being $6\frac{1}{2}$ miles S.W. of Inverness. It is $22\frac{1}{2}$ miles long, with an average breadth of one mile, and is so deep (780 feet) that it never freezes. It receives the Oich, Morriston, Eirick, Foyers, Furigaig, and other streams, and discharges to the Moray Firth by the short but fine river Ness. The lake forms part of the system of the Caledonian Canal. The points of interest on its banks are Fort Augustus, the seat of a Benedictine college and abbey, housed in an imposing building; the stately hill of Mealfourvounie (2,284 feet high); Castle Urquhart; and the Falls of Foyers.

Nesselrode, KARL ROBERT, COUNT, diplomatist, was born on December 14th, 1780, at Lisbon, where his father was Russian Ambassador. He was educated at Berlin and trained for the diplomatic service. He stood high in the favour of Tsar Alexander I., and played the most important parts in framing the Treaty of Paris and at the Congress of Vienna. In 1816 he became Russian Minister of Foreign Affairs, and held the post for forty years, enjoying the complete confidence also of Nicholas I. Though his policy was, on the whole, peaceful, he was hostile to Hungary in the revolution of 1848, and Nesselrode's intervention saved the integrity of Austria. He, however, opposed the Crimean War and, on the accession of Alexander II., retired from public life, though nominally Chancellor for some years longer. He died in St. Petersburg on March 23rd, 1862.

Nessler's Reagent is prepared by dissolving mercuric iodide in a solution of potassium iodide, with the addition of caustic potash. An almost colourless liquid is so obtained which gives a yellow coloration, with faintest trace of ammonia or an ammoniacal compound. It is employed on this account for the estimation of ammonia in potable waters.

Nest, a place or structure where birds deposit their eggs and rear their young. Nests vary greatly in character, from the mere depression in the sand of the ostrich to the dome-shaped, felted structure of the bottle-tit, from the rocky shelf utilised by the gull to the mound raised by the megapode. The term is also applied to the breeding-places of some reptiles and fishes [see cut under ACANTHOPTERYGIAN], and to the dwellings of ants, wasps, and wild bees. Less properly it is used for the dray of the squirrel and the shelter of the orang-utan.

Nestor, one of the Greek mythical heroes, was son of Neleus and Chloris, and husband of Eurydice. His youth was spent in warlike exploits, but in the Trojan expeditions he is the great counsellor of the Greeks. After the fall of Troy he returned to Pylos, in Messenia, where he ruled his people for many years. By a figure of speech his name is often applied to the oldest and wisest adviser of a society, party, or club.

Nestorians, Christian sectaries, long established in the Lake Urmia district, north-west Persia, the Kurdistan mountains, about the Perso-Turkish frontier, and in Mosul, Diarbekr, and other places in the Upper Tigris Valley within the Turkish frontier. Of the total population, variously estimated at from 200,000 to 400,000, many have accepted the teachings of British and American Protestant missionaries. The term Nestāri (Nestorian) is of doubtful origin, and is repudiated by these communities, who disown the heresiarch Nestorius. It is probably a corrupt form of Nasserāni, a common name in the East for Christians, from Nazareth of Galilee; but they call themselves Kaldani, *i.e.* Chaldeans, and appear to be a remnant of the old Semitic Christian people of Mesopotamia, who were of Chaldean or Assyrian stock. They now mostly speak Arabic and Persian, but their liturgical language is a modernised form of Assyrian (Chaldean), with numerous Syrian elements as well as Arabic and Persian words, and written in a peculiar character derived from the Estranghelo (Old Syriac). Some are still in the tribal state, such as the Kojanis about the head-waters of the Tigris (1,000 families), and the Thuris, in the Sulamani district (10,000 families).

Nestorius, a native of Germanicia, Syria, the date of whose birth is unknown. A presbyter of Antioch celebrated for his eloquence and asceticism, he was appointed Patriarch of Constantinople in 428. He denied the personal union of the Godhead and the Manhood in the Son of Mary, and her right to the title "Mother of God." Cyril, bishop of Alexandria, defending the orthodox doctrine, sent letters of admonition to Nestorius, who treated him with contempt. Condemned at Rome, Nestorius was threatened with excommunication, Cyril also issuing anathemas. John, bishop of Antioch, thinking Cyril had fallen into an opposite error, protested, but endeavoured to persuade Nestorius to qualify expressions of doubtful orthodoxy. Nestorius appealed to the Emperor, and consented to call a general council at Ephesus in 431. This council condemned the Patriarch's doctrines and pronounced sentence of excommunication. A second council, presided over by John of Antioch, condemned Cyril. Sessions and counter-sessions were held, but ultimately Nestorius was banished, dying in exile within four years of his deposition. His followers spread throughout India, China and Persia, and, poor and illiterate, often suffered persecution. At the request of their Catholics, an Anglican mission was sent by Archibald Campbell Tait, Archbishop of Canterbury, whose aim was to be "to aid the existing Church," whose headquarters are at Urmia, in Kurdistan.

Netherlands. [HOLLAND.]

Netley, a place on the eastern shore of Southampton Water, $3\frac{1}{2}$ miles S.E. of Southampton, Hampshire, England. It is noted for the ruins of a Cistercian Abbey, dating from the reign of Henry III., and for the Royal Victorian Hospital, founded in 1856 by Queen Victoria, and opened in 1863. The latter was built for the reception of invalid soldiers, and has accommodation for about 1,000 patients. The medical school for candidates for the army medical staff is attached to the hospital, which is also the headquarters of the women nurses of the army.

Nets consist of a fabric of string or twine worked, by knotting, into open meshes of certain dimensions. They probably formed one of the earliest means adopted by primitive man for securing animal food, since remains of nets belonging to the Stone Age have been found in Switzerland. Reproductions of nets on ancient monuments prove them to have been in common use among the Egyptians and the people of ancient Greece. They are used for catching fish, animals, birds, game, and insects; for the protection of fruit and blossoms, and for a variety of domestic purposes. Wire-netting is employed in gardens and for poultry runs, etc. Nets were made by hand—which was a very simple operation, only requiring the use of two instruments—until the beginning of the 19th century, when machines came into vogue. One of the most successful is the Net-Loom, invented by James Paterson and improved by Ritchie in 1835. An improved form of Net-Loom on a different principle was invented by a Frenchman named Pecqueur in 1840, and this was further improved by Haudouin and Jouannin in 1861. The materials chiefly used in the making of nets are: hemp-fibre (called "twine"), cotton, and to a certain extent, flax. The Eskimo make nets of twisted sinews or strips of sealskin, and the Chinese of silk obtained from the silkworm. Silk nets were also used in Greece. In some countries nets are made from the fibres of plants. In order to strengthen them, nets made of cotton or hemp are covered with tar or more often barked in an infusion of cutch. Fishing nets are of many kinds, according to the fish to be caught and the method of catching them. The trammel net catches the fish by entangling them in complicated folds; the mackerel net suspends the fish by the body in the meshes; the seine draws the fish to shore; whilst the trawl receives the fish in pockets. The nets used for catching tunny in the Mediterranean are frequently of immense length, while some hand-made Russian nets are 3,000 feet long.

Nettle, the name applied primarily to the species of the genus *Urtica*, well-known for their stinging hairs. They are mostly erect, herbaceous plants, with opposite serrate leaves, greenish unisexual and apetalous flowers, and minute, dry, one-seeded fruits. The sting is a unicellular hair, filled with formic acid, with a bulb-like base pressed by surrounding cells, and a sharp hooked point that readily catches in the skin and breaks off.

There are two species of nettle, common as weeds in cultivated ground, which may perhaps be indigenous in England—*U. dioica*, the large, and *U. urens*, the small nettle. Some exotic species reach a large size, and their sting may even prove fatal. Both British and foreign species have long been used as a source of fibre. Though gritty from the numerous crystals in their cells, young nettle-tops may be eaten like spinach or asparagus. The name has been extended to the "dead-nettles," species of *Lamium*, merely on account of the resemblance of their hairy, but harmless, leaves to those of true nettles.

Nettle-rash. [URTICARIA.]

Nettle-Tree (*Celtis australis*), a handsome tree, thirty to forty feet high, with smooth bark, brown on the trunk and grey on the branches, and deciduous leaves resembling those of the nettle, whence its name. It occurs chiefly in the Mediterranean region; but, though its wood is very hard, takes a high polish, and is ornamental, it is but little cultivated. It is one of some seventy species of the genus *Celtis*, a member of the elm family, distinguished chiefly by its small fleshy fruit or drupe. This is eaten in Spain and Greece, and may perhaps be the lotus of the ancients. *C. occidentalis* and other American species are generally known as Hackberries.

Neuchâtel, a canton in the north-west of Switzerland, bounded on the W. and N.W. by France, on the N.E. and E. by Bern, on the S.E. by the Lake of Neuchâtel, and on the S. by Vaud. The Jura Mountains traverse it in the north. It has an area of 312 square miles. The chief industries are the making of watches, lace, and wine. Asphalt (from the Val de Travers) and absinthe are exported. In 1707 the principality of Neuchâtel belonged to the house of Brandenburg, having previously belonged to Burgundy, the Counts of Chalon, and the Longuevilles. Napoleon bestowed it in 1807 upon General Berthier, but in 1814 it passed again to the king of Prussia. In 1848 a republic was set up, and, nine years later, Prussia abandoned her claims to the sovereignty. The people are chiefly French-speaking Protestants. Pop. (1900), 126,279. NEUCHÂTEL, the capital, stands on the northern shore of the lake, 26 miles west of Bern. The chief buildings are the ancient château, the collegiate church of Notre Dame (a Protestant place of worship), the Picture Gallery, the College Latin (with the Public Library and Natural History Museum), and the Academy. The leading manufactures are those of watches and jewellery. A monument to Farel, the great Reformer, was unveiled in 1876. Pop. (1900), 21,064. LAKE NEUCHÂTEL, enclosed by the cantons of Neuchâtel, Bern, Friburg, and Vaud, lies at a height of 1,424 feet above the sea, and is 25 miles long, from 2 to 6 miles broad, and about 500 ft. deep. It is fed by the Broye (from Lake Morat) and other streams and drains by the Thiele to Lake Bièvre and thence to the Aar. The principal places on its shores are Neuchâtel, Boudry, Grandson, Yverdon, and Estavayer. The esteemed cream-cheeses are not made

here, but at Neufchatel-en-Bray, a small town in Normandy, 21 miles S.E. of Dieppe.

Neuilly-sur-Seine, a north-western suburb of Paris, situated between the fortifications and the river, and bounded on the south by the Bois de Boulogne. The château of Neuilly built by Louis XV., the favourite palace of Louis Philippe—who, after his abdication, took the title of Comte de Neuilly—was burned down in the revolution of 1848. The chief buildings are St. Peter's church, the asylum founded by the Princess Mathilde in 1853, and the Galignani Almshouse for poor aged booksellers and printers, established by the brothers Galignani. In the château of St. James, built in 1775, for the financier, Claude Baudard, Baron of St. James, and now converted into an asylum, have stayed for longer or shorter periods, Chateaubriand, the Duchess of Abrantes (Junot's widow), and the Duke of Wellington, who made it his headquarters in 1815. Neuilly is a favourite residential quarter with the merchants and tradesmen of Paris. Pop. (1901), 35,297.

Neumünster, a town of Holstein, Prussia, 21 miles S.S.E. of Kiel. It has iron-foundries, breweries, engineering works, besides manufactures of textiles, leather, and paper. Pop. (1901), 27,335.

Neupommern, formerly NEW BRITAIN, an island of the Bismarck Archipelago, in the West Pacific, about 70 miles E. of New Guinea, from which it is separated by Dampier Strait. It lies mainly east and west, but throws out a long projection towards the north-east called Gazelle Peninsula, on the north of which (on Blanche Bay) is situated Herbertshöhe, the seat of administration. The island has an area of 10,000 square miles. It gradually rises to hills of various heights, some of which form active volcanoes. Cocoa-nuts, bananas, yams, bread-fruit, and other tropical fruits grow in profusion, and sea-fishing is vigorously pursued. The natives are Melanesians, warlike, cannibalistic, and cunning, but clever craftsmen, their candles, pottery, and baskets showing decided skill and taste. The island constitutes part of German New Guinea, the German protectorate of the Bismarck Archipelago dating from 1884. The number of the natives has never been computed. Population of others, including whites (1900), 299.

Neuralgia, pain occurring in the course of a nerve (the term is derived from two Greek words signifying "nerve-pain"). Neuralgia may be due to injury of a nerve, or to its involvement by disease affecting parts adjacent to it, as in caries of the spine, hip-joint disease, etc. The common forms of neuralgia are those which occur in association with *anæmia* and *hysteria*. The subjects of malarial disease occasionally suffer from severe neuralgia. The symptoms are pains of a paroxysmal character occurring in the course of distribution of a nerve. There is sometimes some loss of sensation (*anæsthesia*) and usually tenderness on pressure (*hyperæsthesia*). There are often, moreover, certain definite painful spots, the situation of these being

dependent upon the particular nerve involved. In facial neuralgia, for example, the points of emergence of the three branches of the fifth cranial nerve from the bony skull are particularly noteworthy as being such painful spots. Again, in intercostal neuralgia and in sciatica there are definite spots which are painful on pressure. A variety of neuralgia usually affecting the fifth nerve is known as *tic-douloureux*. This disease is happily very rare; the pain is intense, and is accompanied by spasmodic contraction of muscles, whence the term *epileptiform neuralgia*, which is sometimes applied to it. The treatment of neuralgia consists, for the most part, in the treatment of the condition with which the neuralgic pain is associated. In *anæmia*, for example, the use of iron is attended with much benefit. In malaria, quinine is invaluable. Locally counter-irritation is often employed, and electricity has been found useful in some instances. Morphia should not be lightly employed, although in the severest forms of neuralgia its use may be necessary.

Neuritis, inflammation of the trunk of a nerve. Multiple neuritis is a disease in which many nerves throughout the body become affected by inflammation. This occurs, for example, after certain cases of diphtheria, in locomotor ataxia, in *beri-beri* (a malady met with in Japan and other Eastern countries), in leprosy, and in what is known as alcoholic neuritis. The chief symptoms in this last-named disease are paralysis of muscles and sensory irritation, there being usually intense cutaneous hyperæsthesia. Alcoholic neuritis is a rare form of malady; it usually occurs in women, and runs, as a rule, a protracted course.

Neuroptera, an order of insects also known as the Odonata. They have a masticatory mouth, four membranous wings which are approximately equal in size, and are strengthened by a lattice-like series of nerves, from which feature the order obtains its name. They have an incomplete metamorphosis. [INSECTS.] The order is estimated to include about 5,080 species. The best-known members of the group are the Dragon-flies, May-flies, White Ants, and Caddis-flies; it also includes the Ant-lions, Scorpion-flies, and Aphis-lions.

Neusatz (Hungarian, UJVIDEK), a town on the left bank of the Danube, in the county of Bacs Bodrog, South Hungary. It is opposite to Peterwardein, with which there is communication by bridge. A royal free city, it is the seat of a Greek bishop and a centre of Serb culture. It is an important emporium for agricultural produce. Pop. (1900), 29,296.

Neuss, a town of Rhenish Prussia, Germany 4 miles W. of Düsseldorf, communicating by canal with the Rhine, only 1½ miles distant. The church of St. Quirinus, dating from 1209, is a fine example of the transition from the Round to the Pointed Gothic. The industries include textiles, paper, food products, and leather, besides iron-works, brewing, distillery, and engineering shops. Pop. (1901), 28,472.

Neustadt, a town of Silesia, Prussia, Germany, about 30 miles S.W. of Oppeln. It has manufactures of textiles, shoes, carpets, and leather, besides dyeing, brewing, and milling. Pop. (1900), 20,139.

Neustadt, or **WIENER-NEUSTADT**, a town of Austria, 30 miles S. of Vienna. The old castle of the dukes of Babenberg was converted, in 1752, into a military academy. In its chapel Maximilian I. was buried, and the gardens contain a statue of Maria Theresa and other monuments. There are also a 13th-century church and a Cistercian abbey, founded in 1444. The town was nearly destroyed during a great fire in 1834, but was afterwards rebuilt in fine style. The manufactures comprise locomotives, machinery, pottery, leather, bells, and starch. Pop. (1900), 28,700.

Neustadt-an-der-Hardt, a town of the Palatinate of Bavaria, Germany, situated at the foot of the Hardt Mountains, 15 miles W. by N. of Spire. The abbey church, containing tombs of several of the Counts Palatine, dates from the 14th century. The chief manufactures include wine, cloth, paper, and tobacco. Pop. (1900), 17,795.

Neustria, the western part of the Frankish empire after its division in the beginning of the 6th century. It was thus the kingdom of the West Franks in contradistinction to Austria (which was not the modern kingdom of that name), the kingdom of the East Franks, and extended from the Scheldt to the Loire, having Burgundy (roughly, south-eastern France) and Austria (modern Belgium, Luxembourg, and other territories) as its eastern boundary, and Aquitaine (roughly, south-western France) as its southern. Paris was its chief town.

Neutrality is the state of those Powers which during a war, take no part therein, and give no aid to either combatant. Right up to the 19th century neutrality, as it is interpreted in these days, was little understood. We find Henry IV. of France permitting whole regiments of his soldiers to serve the United Provinces against Spain, with which country France was not at war. Charles II. allowed the French to raise levies in England and Scotland. The Swiss cantons made quite a business of the supply of troops to serve against States with which Switzerland had no quarrel. Again, we find the territories, and particularly the territorial waters, of neutral States, invaded by forces for the purpose of attacking ships or troops who had taken refuge there. Thus, in 1631, the Spanish attacked the Dutch fleet in Danish waters; in 1639 the Dutch attacked the Spanish fleet in English waters; and in 1665 the English attempted to cut out the Dutch East India fleet in the harbour of Bergen.

The modern point of view was first assumed by Vattel, in 1758: "Neutrality consists of an impartial attitude so far as war is concerned." It was contended that although a neutral State might not, without giving a just cause for war, help one of two belligerents, it might help both by selling to them warlike stores, and allowing them to enlist

men. Vattel declared that it was a breach of international law to help either. But he spoke to deaf ears. For a long time after his book was published, German States continued to make treaties under which they supplied troops to a nation at war. Piedmont and Holland, though at peace with France, supplied large bodies of troops to Maria Theresa. Great Britain drew troops from Hesse during the American War of Independence.

Gradually public opinion, stirred up by writers on international law, adopted the rule that it is not permissible for a State to assist either or both of two belligerents without rendering itself a belligerent also.

This duty of neutrality has brought in its train corresponding rights for neutral States. A neutral no longer allows its territories or its territorial waters to be entered by either belligerent for hostile purposes. If a ship of war takes refuge in a neutral port, it must either be surrendered to the neutral Power, or must quit the port after a short time—the shortest possible time necessary to allow it to be made seaworthy and to replenish its water supply. On the other hand, a pursuing ship would no longer be allowed to try to cut out such a refugee ship, or to engage it in territorial waters.

The declaration of Paris, 1856, assented to by Great Britain, Austria, France, Russia, Prussia, Sardinia, and Turkey, laid down some rules not, up to that time, in accordance with the practice of Great Britain, as to the protection of neutral sea-borne goods and neutral ships during time of war. (1) "The neutral flag covers enemy's goods except contraband of war." (2) "Neutral goods, except contraband of war, are not liable to capture under the enemy's flag."

At all times and in all ages it has been considered proper for a neutral State to receive within its borders fugitives from a defeated army, or even the whole defeated army. But difficulties formerly arose as to the precise duties of the neutral State, (a) towards the soldiers taking refuge, and (b) towards the other belligerent. It is quite clear that the neutral State is bound in honour to protect such refugees from pursuit. Still more, that it cannot be called upon to deliver them up. But questions were often asked as to whether the fugitives ought to be allowed to remain in freedom so that they could at any time return to their own country.

The Hague Convention, 1899, defined the position thus: The neutral State which receives in its territories troops belonging to the belligerent armies shall intern them, as far as possible, at a distance from the theatre of war. It can keep them in camps or fortresses. It may allow officers to be at liberty on parole not to leave the neutral territory. It *must* provide food, clothing, and relief, for which, at the end of the internment, the country to which the soldiers belong must pay.

The levying of men, and the fitting out of hostile expeditions in a neutral country is now forbidden by the law of nations, and would be regarded as an act of hostility. In Great Britain such things are restrained by the Foreign Enlistment Acts. The

first of these was passed in 1819, forbidding British subjects to enlist or engage in foreign service. A much more stringent statute was enacted in 1870, in consequence of the fitting out, in England, of the *Alabama* and other cruisers. In addition to the offences of enlisting and leaving the country to enlist in service against a friendly State, it was made an offence to (1) build, equip, or despatch a ship with reasonable cause for belief that it will be employed against a friendly State; (2) to issue a commission to such a ship; (3) to aid the warlike equipment of such a ship; and (4) to aid in the fitting out of any military expedition. Power is given to the Secretary of State to detain ships on suspicion.

In no other country in the world is the duty of neutrality so strictly enforced as in Great Britain. Thus, during the Boer war, volunteers from most European countries served against Great Britain without fear of punishment from their own Government. And it is generally held that a neutral State is not (unless it gives facilities or encouragement) responsible for the acts of private citizens who may volunteer to serve in a war against a friendly State.

The most famous case in international law on the question of neutrality is that commonly called "The *Alabama* Case." During the Civil War in America, Great Britain issued a proclamation of neutrality; but, nevertheless, three ships left English ports, obviously intended for warlike purposes, received their arms at sea, and, in the service of the Confederate States, ravaged the commerce of the Northern States. After the conclusion of the war, the United States claimed damages from Great Britain for breach of neutrality, and a commission of five arbitrators awarded them fifteen and a half millions of dollars. The basis of the arbitration were the following propositions: (1) That every neutral Power is bound to use due diligence to prevent the fitting out of any vessel within its jurisdiction which it has reason to believe is intended for hostile purposes, and also to use due diligence to prevent the departure from its ports of any vessel wholly or partly fitted up for war within its jurisdiction; (2) Not to permit any of its territory to be used as a naval base, or as a place for renewing warlike stores or recruiting men; (3) To use due diligence to prevent any violation of the aforesaid obligations as to all persons within its jurisdiction.

These propositions may be taken to be the foundation of the modern law of nations on the question of neutrality.

Neutral Substances are substances which do not exhibit either an acid or an alkaline reaction. Thus acids change the colour of litmus from blue to red, while alkalis have a reverse action, and a neutral substance has no action upon either red or blue litmus. If an alkali be added to an acid, the properties of the acid are neutralised, and eventually the solution becomes neutral and contains a neutral salt. The quantities of acid and alkali then used are said to be equivalent to one another.

Neuveville, ALPHONSE MARIE DE, painter, was born at St. Omer, department of Pas-de-Calais, France, on May 31st, 1836. He attended art classes for three years, then entered F. E. Picot's studio and first exhibited at the Salon in 1859, when he was represented by two pictures of the siege of Sebastopol. He soon acquired a great reputation for his battle-scenes, which he rendered with a dash and actuality in refreshing contrast to the conventional and academic method in vogue before his time. He had fought in the ranks, which no doubt was an advantage to him as an artist, but he was an excellent draughtsman, and his skill in composition was of the highest order. Among his works may be named, "Épisode de la Bataille de Magenta" (1864), "Sentinelle avancée" (1865), "Mort du Général Espinasse" (1868), "Chasseurs à pied" (1870), "Les dernières Cartouches" (1873), "Une Surprise aux environs de Metz" (1875), "Défense du Bourget" (1879), and "Le Cimetière de St. Privat" (1881). In collaboration with Édouard Detaille he painted (1881) the panorama of the battle of Champigny, exhibited in Paris with enormous success. He also illustrated many books. He died in Paris on May 20th, 1885.

Neva, a river of Russia, flowing from Lake Ladoga westwards into the Gulf of Finland and passing through St. Petersburg, its whole course being 40 miles in length. It is about two-thirds of a mile wide in the broadest part, and carries an immense volume of water. It is frozen over throughout the winter. The Ladoga Canal connects it with the Volga, and so with the Caspian Sea.

Nevada (Spanish, "snow-clad"), one of the western States of the American Union, bounded on the N. by Oregon and Idaho, on the E. by Utah and Arizona, on the S.E. by Arizona, and on the W. and S.W. by California. It has an area of 109,740 square miles and a population (1900) of 42,335, being one of the largest of the States and the least populous. Its lakes and "playas" are the remains of what was once a great inland sea. Numerous ranges of mountains traverse the country, the Sierra Nevada skirting it on the west, the rest of the State being a plateau about 4,000 feet above the sea-level. The only river of importance is the Humboldt, which runs across the north of Nevada, from east to west. The climate is very dry, and in some districts it is said that no rain falls for two or three succeeding years. Hot springs are a feature of the country, which is of great interest to the geologist. Owing to the scanty rainfall, Nevada is not well adapted for agriculture, but in the more protected tracts and where irrigation is practised, wheat, hay, and potatoes are raised in fair quantities. Cattle and sheep are reared successfully, and the wool-clip is considerable. In the extreme south cotton, oranges, and other sub-tropical fruits are grown. The mineral wealth of the State is great, gold and silver having been mined since 1859. The Comstock Lode and Big Bonanza silver and gold-bearing quartz at Virginia City once formed one of the most profit-

able deposits in the world. Copper, lead, quick-silver, and nickel also occur, and deposits of sulphur, borax, potash, arsenical ores, soda, and other minerals, exist. Nevada, popularly known as the "Sage-brush State," was acquired from Mexico in 1848, was organised as a Territory in 1861, and admitted as a State in 1864. The capital is Carson City (pop. 2,100), and the principal towns are Reno (4,500), which has the State university, and Virginia City (2,695). Some towns that once promised to become thriving centres have been abandoned in consequence of the failure of mining enterprise.

Nevers, the chief town of the department of the Nièvre, France, on the right bank of the Loire, at the confluence of the Nièvre, 38 miles E. by S. of Bourges. Its history dates back to the time of Cæsar's Gallic wars, when it was called Noviodunum. The principal buildings are the cathedral of St. Cyr, partly Roman and partly Gothic, the western apse dating from the 11th century; the 11th and 13th century church of St. Etienne; the Palais de Justice, forming the residence of the Dukes of Nevers; and the Hôtel de Ville, containing a picture gallery, museum and library. In 1746 a triumphal arch, the Porte de Paris, for which Voltaire composed the inscriptions, was erected to commemorate the battle of Fontenoy. Cannon-founding and the manufacture of *faïence* are the leading industries. Pop. (1901), 25,116.

Nevis, one of the Leeward Islands, of the group of the Lesser Antilles, West Indies, belonging to Great Britain. It was discovered by Columbus in 1493, and colonised by the English early in the 17th century. It is four miles long by three miles broad, and has an area of 50 square miles. The land slopes down from a cone in the centre which is 3,200 feet high. Though the island is liable to hurricanes and earthquakes, the sugar-cane is successfully cultivated. Nevis was formerly a great slave mart. Charlestown is the capital. The island sends three representatives to the Legislative Council, which it shares with St. Christopher, which it closely adjoins. Pop. (1901), 15,300.

New Albany, chief town of Floyd county, Indiana, United States, on the Ohio, nearly opposite Louisville, with which it is connected by bridges. The industries include pork and other meat products, cutlery and tools, plate glass, engines and boilers, textiles, leather, furniture, and flour. It is the seat of the De Pauw College for women, founded under the Indiana Methodist Conference in 1850. Pop. (1900), 20,628.

Newark, a town in Nottinghamshire, England, on a branch of the Trent, 17 miles N.E. of Nottingham. It takes its name from its castle, the "New Wark," which was built in 1125 by the Bishop of Lincoln on the ruins of a Saxon stronghold, and is itself now only a picturesque shell. The grammar school dates from 1529, and the beautiful parish church was erected in the 14th and 15th centuries. Newark was incorporated by Edward VI., and returned two members to Parliament till 1885, when it was disfranchised. W. E. Gladstone was

one of its representatives in the first Reformed Parliament. The town is an important agricultural centre, malting, brewing, iron-founding, and agricultural implement-making being the chief industries, besides engineering shops and plaster-of-Paris works. Pop. (1901), 14,992.

Newark, capital of Essex county, New Jersey, United States, on the Passaic, 9 miles by rail W. of New York. Though settled from Connecticut in 1666, it contains few remarkable public buildings, but many of the business structures are handsome, and the charm of the town has been enhanced by the system of public parks. It is of the first importance as an industrial centre, its manufactures being very diversified, and including cotton, chemicals, jewellery, leather, machinery, clothing, carriages, metal ware, electrical appliances, and paper, besides brewing, iron-foundries, and meat products. Pop. (1900), 246,070.

New Bedford, a town and seaport of Bristol county, Massachusetts, United States, on the western bank of the estuary of the Acushnet, 56 miles S. of Boston. It contains many elegant private residences and handsome business houses, and the public library is one of the oldest in the country. Till the decline of the trade in the middle of the 19th century, New Bedford took a prominent part in the American whale fisheries, as many as 400 whalers at one time belonging to the port. Its cotton and yarn mills are the largest in the United States, and other industries include the manufacture of cordage, shoes, oils, glass, paper, soap, and machinery. Pop. (1900), 62,442.

Newbery, JOHN, publisher, was born at Waltham St. Lawrence, Berkshire, England, in 1713. After a few years' experience in Reading, he set up in London, in 1744, as a publisher and vendor of medicines. He was the first to publish children's books, some of which he helped to write. In Newbery's *Universal Chronicle* Dr. Johnson's *Idler* appeared, and in his *Public Ledger* Goldsmith's *Citizen of the World* saw the light. But it was to his nephew Francis, and not to him, that Johnson sold the MS. of the *Vicar of Wakefield* for £60. Newbery also published in separate form the *Idler* and the *Rambler*, besides the *Lives of the Poets*. He was a clear-headed, good-natured, enterprising man, and, in addition to several other periodicals, projected in 1760 the first religious serial publication, the *Christian Magazine*. He died in his house in St. Paul's Churchyard, London, on December 22nd, 1767.

New Britain, a town of Connecticut, United States, 9 miles S.W. of Hartford. The manufactures include hardware, cutlery, hosiery, and jewellery. The chief public buildings are the State normal school, the New Britain Institute, and the Roman Catholic cathedral. Elihu Burritt, "the learned blacksmith," was born here in 1810 and died here in 1879. Pop. (1900), 25,998.

New Brunswick, a province of Canada, bounded on the N. by Quebec, from which it is

partly separated by the Restigouche and Chaleur Bay, on the E. by the Gulf of St. Lawrence and Northumberland Strait, on the S.E. by Nova Scotia, on the S. by the Bay of Fundy, and on the W. by the State of Maine. It occupies an area of 28,000 square miles. The surface is mostly flat or undulating, the highest points being Bald Mountain (2,470 feet) and Blue Mountain (1,600). The principal streams are the St. John (about 500 miles long), the Miramichi (220 miles), and the Restigouche (125 miles). The extensive coastline provides many excellent bays and harbours. Of many lakes the largest is Grand Lake, 30 miles long by 7 miles broad. The climate is subject to great extremes of heat and cold. Agriculture is the leading industry, oats, wheat, and potatoes furnishing the best crops. Live-stock are profitably raised and dairy produce is of increasing importance. The salmon fisheries are among the finest in the world. Coal is the most valuable mineral, but copper, nickel, antimony, and manganese occur. The manufactures include wood-pulp, woollens, paper, sawn lumber, locomotives, engines, boilers, boots and shoes, canned goods, rope and cordage. The abundant forests favour shipbuilding. The principal towns are St. John (pop. 40,711), Moncton (9,026), and Fredericton (7,117), the capital. Partially colonised by the French in the 17th century, New Brunswick, along with Nova Scotia, formed part of Acadie, which was ceded by France to England in 1713, though boundary disputes lasted until the treaty of Paris ended them in 1763. Scottish settlers arrived in 1764, and, after the American War of Independence, loyal emigrants also migrated to New Brunswick, which, in 1784, was separated from Nova Scotia and constituted a separate colony. In 1867 it became part of the Dominion of Canada. It is governed by a legislative assembly and responsible ministry, with a lieutenant-governor, appointed by the Governor-General of Canada, at the head of the executive. Pop. (1901), 331,120.

New Brunswick, capital of Middlesex County, New Jersey, United States, on the Raritan, 31 miles S.W. of New York. It is the seat of Rutgers College, founded in 1766, connected with which is the theological school of the Dutch Reformed Church, besides the State Mechanical and Agricultural College. The chief manufactures are india-rubber goods, carpets, hosiery, and iron and steel goods. Pop. (1900), 20,006.

Newburgh, a royal burgh of Fifeshire, Scotland, on the southern shore of the Firth of Tay, 11 miles E.S.E. of Perth. The principal buildings are the town-house (1808) and the Gothic parish church of St. Catherine's, erected in 1833 from designs by William Burn. Weaving, malting, quarrying, and fishing are carried on. Newburgh was so named to distinguish it from the declining old town of Abernethy, and was erected into a burgh of barony in 1266 by Alexander III. In the immediate vicinity are the ruins of the Benedictine Abbey of Lindores, founded about 1200, and a curious relic called Macduff Cross, which

has puzzled antiquaries, and is traditionally supposed to have been granted to Macduff and his clan as a sanctuary, in return for the thane's assistance against Macbeth. Near Lindores village, on June 12th, 1298, was fought the battle of Black Earnside, in which Wallace defeated the English under the Earl of Pembroke. Pop. of Newburgh (1901), 1,900.

Newburgh, a town in Orange county, New York, United States, finely situated on the right bank of the Hudson, 60 miles N. of New York. The industries include tanneries, iron-foundries, cottons and woollens, shipbuilding, carpets, flour, and machinery. The dairy produce of the farms in the neighbourhood is of annually increasing value. Hasbrouck Mansion, the headquarters of Washington when he disbanded the American army (June 23rd, 1783), has been acquired by the State. Pop. (1900), 24,943.

Newbury, a market town of Berkshire, England, on the Kennet, 17 miles W.S.W. of Reading. Malting is carried on and there is also an important trade in agricultural produce. The town was founded on the site of an old Roman station (hence the name), and was incorporated in 1596. The fine perpendicular church was restored in 1867. There are several good modern buildings. Two battles were fought in the neighbourhood during the Great Rebellion. In the first, which took place on a hill to the south of the town, Essex defeated the Royalists (September 30, 1643), Falkland falling in the battle; the second (October 27, 1644), the scene of which was the country to the north, was indecisive in character. Pop. (1901), 11,061.

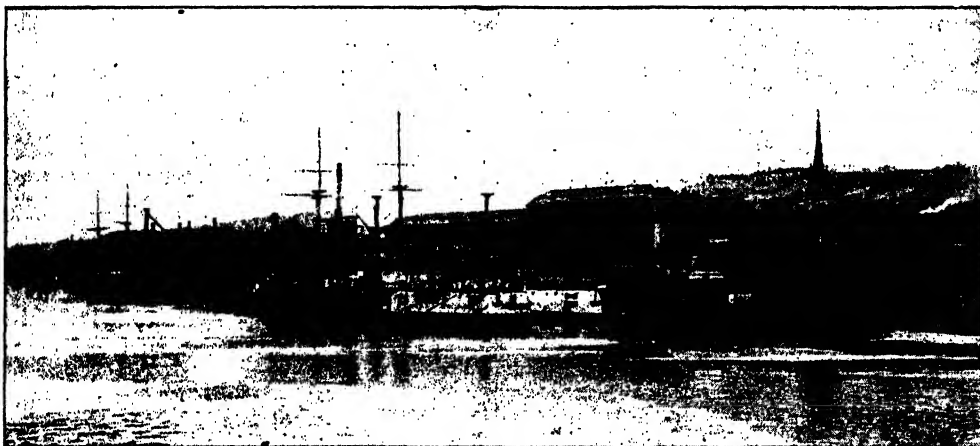
Newburyport, a seaport of Essex county, Massachusetts, United States, on the Merrimac, 3 miles from the Atlantic and 35 miles N.N.E. of Boston. The leading industries comprise machinery, boots and shoes, rope and cordage, carriages, and shipbuilding. George Whitefield died here, during a revivalist tour (September 30th, 1770), and was buried in Old South Church. William Lloyd Garrison, the Abolitionist, was a native of Newburyport, where he was born on December 10th, 1805. Pop. (1900), 14,478.

New Caledonia, an island in the South Pacific, lying between 20° 10' and 22° 25' S. and 164° and 167° E., belonging to France. It is about 240 miles long and from 25 to 30 miles broad and has an area of about 7,000 square miles. It is surrounded by coral reefs; but there are some good harbours, notably that of the capital, Noumea, on the south-west (pop. 6,968). The island was discovered by Captain Cook in 1774, and occupied by France as a convict settlement in 1853. Politically it is grouped with the Loyalty and other surrounding islands. New Caledonia is mountainous in the interior (Mount Humboldt, 5,380 feet, being the highest point), but has fertile valleys in which cocoa-nut, maize, fruits, tobacco, and coffee are grown. The nickel-mines are valuable, and there is other mineral wealth. Turtle and fish abound, and so also do the destructive

locusts, while the prevailing mammals are bats. Leprosy is common amongst the aboriginal inhabitants, who were until comparatively recent times cannibals. Pop. (1901), 51,415, of whom the Kanaks form more than half.

New Caledonians, the aborigines of the French colony of New Caledonia, South Pacific Ocean, of Melanesian stock [MELANESIANS]. They are still mostly in the wild state and rapidly diminishing in numbers through contact with European vice, drink, and epidemics (fell from 70,000 in 1845 to 29,106 in 1901). As they refuse to work on the plantations, they are being steadily supplanted by coolies imported from the Loyalty and New Hebrides archipelagoes.

military station on the high ground commanding the river. During Saxon and early Norman times the town was ecclesiastical, and was known as Monkchester. It was incorporated by Henry II., and in 1400 was given the privileges of a county. The corporation was remodelled in 1835, and to commemorate his visit in 1906 Edward VII. raised its mayor to the dignity of lord mayor. The buildings of interest, besides the castle, are the cathedral of St. Nicholas (chiefly Decorated), with a Perpendicular lantern tower and beautiful open-work crown; St. Andrew's church (11th century); St. John's church (14th century), with an ancient font; and, among more modern structures, the Corporation building, the Moot Hall, and Allen's endowed schools. Newcastle was largely rebuilt by Richard Grainger (1798.



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ELSWICK WORKS, NEWCASTLE-ON-TYNE.

Newcastle, capital of Lawrence county, Pennsylvania, United States, on the Shenango, 50 miles N.W. of Pittsburg. It has iron-foundries, blast-furnaces, and rolling-mills, besides manufactures of glass, paper, and flour. Pop. (1900), 28,339.

Newcastle, a seaport of New South Wales, Australia, 72 miles N. by E. of Sydney. It does a great shipping trade, for which it has ample quays equipped with modern appliances. The chief exports are wool, frozen meat, and coal. The harbour is protected by forts. The town is the seat of an Anglican bishop. Pop. (1901, with suburbs), 51,991.

Newcastle-on-Tyne, a city and county of itself, Northumberland, England, on the left bank of the Tyne, 270 miles N.N.W. of London, and 8 miles from the North Sea. The "new castle" from which it takes its name was built between 1172 and 1177 on the site of the older one erected by Robert, son of William I. The Black Gate still remains, and the Keep is perhaps the finest specimen of secular Norman in England. The germ of Newcastle was the Roman Pons Aelii, a

1861), an architect and native of the city. Among educational and benevolent institutions are the Colleges of Medicine and Science (affiliated to the University of Durham), the Royal Free Grammar School, the Royal Infirmary, the Jubilee Infirmary, and Armstrong College. The chief industries are associated with the coal trade, shipbuilding, and the making of engines of all kinds, cannon, carriages, glass, bricks, and tiles. The most important establishment are the works of Armstrong, Mitchell & Co., at Elswick, which have an extensive equipment of engine shops, foundries, blast furnaces and steel works and turn out ironclads and ordnance. Other notable houses are those of Robert Stephenson & Co., and Hawthorn, Leslie & Co., constructors of locomotives and marine engines. Newcastle is connected with Gateshead, on the south bank of the river, by the High Level bridge (1846-9), designed by Robert Stephenson, the Swing bridge (1868-76), the Redheugh suspension bridge (1868-71) and King Edward Bridge (1906), named after Edward VII., who opened it. The city became the seat of a bishop in 1882. Pop. (1901), 215,328.

Newcastle-under-Lyme, a town of Staffordshire, England, on the Lyme, 147 miles N.W. of London. It derived its name from the rebuilding of its castle by Henry I.; the forest of Lyme lay to the north. The town was incorporated by Henry II. It has a well-endowed high school; the old parish church was rebuilt in 1876 under the supervision of Sir Gilbert Scott. Paper-making, the making of army clothing, and brewing are now the chief industries, the hat manufacture having decayed. There are potteries and collieries in the vicinity. The Clintons, Dukes of Newcastle, took their title from the town. Pop. (1901), 19,914.

Newchwang, a town of the province of Manchuria, China, on the Liao, 75 miles S. by W. of Mukden. It was opened to foreign trade in 1858, but Ying-tsze, lower down the Liao, is really the treaty-port, as vessels are not able to get up as high as Newchwang. The port, which is closed by ice during the winter, formerly imported large quantities of opium; it now chiefly takes in manufactured goods, beans and silk being the chief exports, but is a very important emporium. The salt industry is carried on in the neighbourhood. Railways connect Newchwang with Peking and Tientsin to the south, and with the Siberian railway to the north. During the Russo-Japanese War, in 1904, Newchwang was first occupied by the Russians, who eventually evacuated it, and the Japanese took possession. Pop. estimated at 60,000.

Newcomb, SIMON, astronomer, was born at Wallace, Nova Scotia, on March 12th, 1835, and came to the United States in 1853. In 1857, whilst acting as a schoolmaster in Maryland, he was employed as computer for the *Nautical Almanac*. He was appointed Professor of Mathematics in the American Navy in 1861, and superintended the construction and erection of the 26-in. equatorial telescope at Washington, then the largest in the world. In 1871 he was appointed Secretary to the United States Commission for the observation of the Transit of Venus in 1874. He was editor of the *American Journal of Mathematics*, and, in 1876-7, President of the American Association for the Advancement of Science. From 1877-97 he was director of the *Nautical Almanac* Office. He observed the Transit of Venus at the Cape of Good Hope in 1882. In 1884 he became Professor of Astronomy in Johns Hopkins University, which position he held until 1893. He was made an Officer of the Legion of Honour, and had the distinction of being the only American, since Franklin, elected an Associate of the Institute of France. He received the Copley, Huygens, Bruce, and Royal Society Medals for his scientific research. He wrote many text-books on mathematics and popular astronomy.

Newcomen, THOMAS, the inventor of the atmospheric steam engine, was born at Dartmouth, Devonshire, England, on February 28th, 1663. He was associated in his invention with John Calley or Cawley, who found the money. In 1698 a somewhat similar device was patented by Thomas Savery, but Newcomen had been at work on his

invention many years before, and his engine was considered an improvement. But the two men do not seem to have been rivals, for they entered into partnership. In 1712 the engine was successfully used to draw water in Wolverhampton, and was much employed later in collieries in Midlothian, Stafford, Warwick, Cornwall, and Flint. A copper-plate print of an engine by Newcomen, dated 1712, represents an atmospheric engine with wooden beam and arch-heads, and a plug-rod provided with tappets for working the injection and steam valves. The engine was $5\frac{1}{2}$ horse-power, and made 12 strokes a minute, raising 50 gallons of water from a depth of 156 feet. Newcomen died in London in August, 1729.

Newdigate, SIR ROGER, connoisseur, was born at Arbury, Warwickshire, England, on May 30th, 1719, and educated at Westminster School and University College, Oxford. He succeeded to the baronetcy in 1734. From 1741 to 1747 he was M.P. for Middlesex, and from 1750 to 1780, when he retired, he represented Oxford University. He was a collector of marbles, statues, and vases. The two marble candelabra found in Hadrian's Villa, at Tivoli, which he bought for £1,800, he presented to the Radcliffe Library, Oxford, to which was also removed, at his cost, the Arundell collection. Newdigate is chiefly remembered as the founder of the Newdigate prize (of the annual value of twenty-one guineas) for English verse, offered every year for competition by Oxford undergraduates. He died at Arbury on November 23rd, 1806.

New England, a name given by Captain John Smith, author of *The Description of New England* (1616), to the north-eastern part of the United States territory. The term includes Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island, which cover an area of 67,400 square miles. Their inhabitants were nicknamed Yankees. Pop. of the group (1900), 5,592,017.

New Forest, THE, a picturesque tract in south-western Hampshire, England, west of Southampton Water, covering upwards of 92,000 acres. It has borne this name since 1079, when William I. created it for hunting purposes. William Rufus and Richard, two of his sons, met their deaths in it. Severe forest laws were afterwards enacted and enforced. In 1851 the deer were taken away, and since 1877 the forest has been managed by a Court of Verderers in the interests of the people. There are fine oaks and beeches. A breed of ponies peculiar to the forest has been rendered familiar by the pictures of Lucy Kemp-Welch. The glades are also the haunt of gipsies. The chief villages within or on the verge of the area are Lyndhurst, where the forest warden has his headquarters, Brockenhurst and Ringwood. Malwood was the residence of Sir William Vernon Harcourt. In Lyndhurst church there is an altar-piece by Lord Leighton.

Newfoundland, an island and the premier colony of Great Britain, situated in the mouth of the Gulf of St. Lawrence, separated from Labrador by Belle Isle Strait, from Cape Breton Isle by

Cabot Strait, and bounded on the N.E. and S. by the Atlantic. It measures 370 miles long, 290 miles broad, has an area of 40,200 square miles, and is the nearest part of North America to Europe. The coast of Labrador as far north as Hudson Strait is under the jurisdiction of Newfoundland. The interior has never been properly explored. The highest land is found in Avalon Peninsula, where an elevation of 2,000 feet is reached. The rivers are mostly small and unnavigable, but yield salmon plentifully. The most striking physical feature is the number of lakes, which are calculated to occupy one-third of the surface of the island. The heavily indented coast provides many capacious bays, the more important being Trinity Bay, Placentia Bay, Fortune Bay, St. Mary Bay, St. George Bay, Notre Dame Bay, White Bay, and Bonavista Bay. The chief promontories are Cape Bauld in the north, Cape Ray in the south-west, and Cape Race in the south-east. The climate, though not exposed to extremes, is somewhat trying, the winter being long, and dense fogs infest the shores and the Banks in May and June. Iron, coal and copper are the principal minerals. Farming, long backward, is improving, oats, barley, potatoes, hay, turnips, and wheat being raised, while apples and other tree fruit, and strawberries, raspberries and gooseberries, are also successfully grown. There are large stretches of forest, mostly pine and spruce. The staple industry, however, is the fishing, which employs the greater part of the population, the cod-fishery being the most valuable. It is carried on along the shore of Newfoundland, on the Grand Bank, and off the coast of Labrador, in or about whose harbours the fishermen live during the season. The Banks are a submarine plateau, 600 miles long and 200 miles broad, varying in depth from 60 feet to over 900 feet. Large numbers of seals are annually killed and exported to England, and lobster-canning is another important trade. Originally discovered by the Norwegians, Newfoundland was again sighted by Cabot in 1497. Sir Humphrey Gilbert's expedition took formal possession of the island in the name of England in 1583, and after the navigator's dramatic death it was claimed for Queen Elizabeth by Sir Francis Drake in 1585. In the following century British colonies were founded on the island, but it was not till the Treaty of Utrecht (1713), ratified by treaties of 1763 and 1783, that the exclusive sovereignty of Great Britain was recognised by France. Treaty rights notwithstanding, fishery disputes periodically broke out between British and French, but were adjusted by the Anglo-French Convention of 1904, under which France renounced her rights under the Treaty of Utrecht, but retained the right to fish in territorial waters from St. John's Cape to Cape Ray for fish of all kinds, bait and shell-fish. In 1832 Newfoundland received a constitution, and in 1855 responsible government was established in the colony. The Administration consists of a Governor appointed by the Crown, an executive Council, a legislative Council, and a General Assembly. Newfoundland is the only territory in British North America which does not form part of the Dominion of Canada. In 1839 it became an

episcopal see. St. John's is the chief town and seat of government (pop. 29,594), and other considerable towns are Harbour Grace (5,184), Carbonear (3,703), and Bonavista (3,696). The small islands of St. Pierre and Miquelon, lying to the south of the colony, are French possessions and the centre of a rival fishery trade. Pop. (1901), 217,037.

Newfoundland Dog, a breed of large water-dogs, introduced into England from Newfoundland, where they were used to draw sledges and small carts. The coat is long and curly, but not so close as that of the spaniel or the retriever. Black is the colour of pure Newfoundlands, black and white dogs being known as "Landseer" Newfoundlands, from Sir E. Landseer's celebrated picture, "A Distinguished Member of the Humane Society." Newfoundlands are good-tempered, though somewhat uncertain, of great intelligence, admirable water-dogs; as watch-dogs they almost rival the mastiff, and from them the retriever is derived by crossing.

Newgate. The original London prison was so called from its having been situated in the portal of the New Gate of the city. The structure that succeeded it, erected from a legacy of Sir Richard Whittington, was destroyed in the Great Fire of London (1666). In 1780 the next building was damaged by fire during the Gordon Riots, when most of the prisoners were set free, the pandemonium which then prevailed being described in *Barnaby Rudge*. For a period it was used as a debtors' prison (till 1815), and afterwards accommodated prisoners awaiting trial and those about to undergo capital punishment, latterly carried out within the walls. After the passing of the Prisons Bill (1877) the site became too costly for the little use made of the building, and in 1902-3 Newgate was demolished to make room for the New Sessions House, which was completed in 1906.

New Guinea, in the South Pacific, the largest island in the world, excepting Australia, from which it is separated by Torres Strait, about 90 miles wide, and with which, countless ages ago, probably in the Miocene period, it was united. It measures 1,500 miles long, varies in width from 20 miles to 480 miles, and has an area of over 300,000 square miles. The island consists of a central mass sloping from north-west to south-east, with peninsulas at each extremity. Geelvink Bay is an inlet on the north-west, and the Gulf of Papua on the south-east. An almost continuous range of mountains traverses the island and is concentrated into several peaks at the south-east. The Arfak hills, in Beran Peninsula, reach a height of 10,000 feet. The Charles Louis range has peaks towering to 20,000 feet. The Finisterre mountains in Kaiser Wilhelm Land are 11,500 feet high, while some points of the Owen Stanley Mountains attain an altitude of 12,000 and 13,000 feet. The Fly, in British Guinea, the Empress Augusta in German, and the Amberno in Dutch territory, are the chief rivers. The climate is hot and very moist, and the prevalence of fever renders New Guinea

difficult for Europeans to live in. The flora resembles the Asiatic rather than the Australian type. The cocoa-nut, the banana, mango, and sugar-cane flourish, and some European trees—such as the oak and cedar—are not uncommon. The fauna, however, is of the Australian type. Kangaroos and other marsupials abound. Characteristic species are a peculiar kind of python, three kinds of ant-eaters, and the bird of paradise. Though Papuans constitute the mass of the native population, other elements are present, such as the Negrito, Eastern Polynesian and Malay. New Guinea was discovered early in the 16th century by the Portuguese, and was given its name by Ortiz da Retez, who thought the inhabitants resembled those of the Guinea Coast in Africa. In 1793 the British East India Company formed a settlement on an island off the north-west coast, but in 1814 gave way to the prior rights of the Dutch, who in 1848 annexed all the western part of the island, containing about half of the whole. In 1884 the rest was divided between Great Britain and Germany, the latter taking a strip on the north which is known as Kaiser Wilhelm Land. The sovereignty of the Crown was not proclaimed over British Guinea till 1888, when Sir W. Macgregor was made administrator. The expense of governing it was shared between New South Wales, Victoria, and Queensland, till 1905, when the Government of the Australian Commonwealth took it over. Port Moresby is the only station of importance. Dutch New Guinea is under the Residency of Ternate, and Germany administers Kaiser Wilhelm Land from Herbertshöhe in Neupommern of the Bismarck Archipelago. Pop., almost entirely composed of natives, estimated at 440,000.

New Hampshire, one of the New England States of the American Union, bounded on the N. by Quebec, on the E. by Maine, on the S.E. by the Atlantic, on the S. by Massachusetts, and on the W. by Vermont. It occupies an area of 9,305 square miles. Most of the surface is hilly, the chief elevated mass being the White Mountains, the highest points of which, named after famous Presidents, are Washington (6,293 feet), Adams (5,805), Jefferson (5,725), Monroe (5,390), and Madison (5,380). The principal rivers are the Connecticut, practically forming the western boundary; the Merrimac and the Piscataqua, both flowing to the Atlantic; and the Androscoggin, which enters Maine a few miles east of Gorham. Winnepesaukee, the largest lake, is 20 miles long and contains several islands. Though much of the soil is ill adapted for farming, yet oats, Indian corn, hay, barley, and potatoes are successfully grown, and some tobacco is raised. Iron, copper, lead, silver, zinc, and tin are the leading minerals, and from the abundance of granite the State derives its popular name of the Granite State. The manufactures include cottons and woollens, boots and shoes, machinery, metal ware, paper, leather, lumber, and timber products. The chief towns are Concord, the capital (pop. 19,632), Manchester (56,987), Nashua (23,898), Dover (13,207), and

Portsmouth (10,637). Dartmouth College in Hanover is the foremost educational institution in the State. The settlement of the land began in 1623, and in 1643 it came under the control of Massachusetts. Constituted a royal province in 1679, it formed one of the thirteen foundation States (1776). Franklin Pierce (1804-69), the fourteenth President, was a New Hampshire man. Pop. (1900), 411,588.

New Harmony, a town of Posey county, Indiana, United States, on the Wabash, 14 miles N. of Mount Vernon. Its historical associations supply its chief interest. It was founded in 1815, under the name of Harmony, by George Rapp (1770-1847), a native of Wurtemberg, for the sect called Harmonists, of which he was leader, and whose aim was to establish a community on the lines of New Testament teaching. The property was sold in 1825 to Robert Owen (1771-1858), who renamed it New Harmony and spent £40,000 in a vain attempt to run it on Socialist principles. The industries are mainly connected with flour-milling and lumbering. Pop. (1900), 1,341.

Newhaven, a fishing village, Midlothian, Scotland, on the southern shore of the Firth of Forth, 1 mile W. of Leith and 2 miles N. of Edinburgh. It arose in the reign of James IV., when it became known as Our Lady's Port of Grace. It was then noted for its shipbuilding, and the *Michael*, launched there in 1511, was the largest ship in Scotland. It suffered from the English assault in 1544, and afterwards declined as Leith advanced. It has always been famed as a fishing station, and there is a good harbour for the fleet. Of its picturesque fishwives, once familiar figures in the streets of Edinburgh, Charles Reade gave a capital account in *Christie Johnstone*, and the village itself formerly enjoyed a great vogue for fish dinners. Pop. (1901), 7,636.

Newhaven, a seaport, Sussex, England, at the mouth of the Ouse, 8½ miles E. of Brighton. It has a Norman church dating from the 12th century, and there is a large fort for coast defence with modern equipment. The port has a considerable shipping trade, but is best known for its daily service to Dieppe, in France, the Channel crossing occupying four hours. Pop. (1901), 6,772.

New Haven, a seaport and the largest city in Connecticut, United States, capital of New Haven county, at the head of an inlet of Long Island Sound, 73 miles E.N.E. of New York. Many of its streets are shaded with elms—hence its name of the "Elm City"—and it is one of the most beautiful towns in the United States. It is one of the leading educational centres, being the seat of Yale University, removed here in 1718; Hopkins Grammar School, founded in 1660; Boardman Manual Training School, and many other important institutions. Several learned societies make the city their headquarters, among them the Connecticut Academy of Sciences and the New Haven Historical Society. It is also a prominent industrial centre, the principal manufactures embracing

carriages and waggons, hardware, corsets, foundry and machine-shop products, fire-arms, indiarubber goods, and paper. The town was settled in 1638 by a number of English Puritans. Edward Whalley and William Goffe, the regicides, who had arrived in New England in 1660, reached New Haven in 1661, and were concealed for several years in Judges' Cave in what is now West Rock Park. The town was the capital of the colony of New Haven until this was merged (1667) in Connecticut. From 1701 till 1873 it was joint capital of the State with Hartford, which became sole capital in the latter year. Pop. (1900), 108,027.

New Hebrides, a group of islands in the South Pacific, lying to the W. of the Fijis and N.E. of New Caledonia, and occupying an area of 5,000 square miles. Of the thirty islands twenty are inhabited, and of these Espiritu Santo, Mallicolo, Efate or Sandwich, Eromanga, Ambrym, Tanna and Anietyan are the largest. The New Hebrides were discovered by the Portuguese in 1606, and explored by Captain Cook in 1673. The people, mostly Papuans, are cannibals. The natives of Eromanga killed and ate John Williams, the missionary, in 1839, but attempts have since been made to civilise them, although the deportation of natives for forced service in the plantations of Queensland and elsewhere—often accompanied, it is said, with cruelty and hardship—has not made the task any easier. The islands are mountainous, in part volcanic, and richly covered with vegetation. The chief products are coconuts, maize, millet, coffee, bananas and vanilla, and the Kauri pine wood is also exported. Most of the trade is with Sydney and Noumen. In some places sulphur is abundant. No European Power has yet succeeded in appropriating the group, but the islands are under a mixed commission of British and French naval officers on the Pacific station, charged with the protection of life and property. The Anglo-French Convention of 1904 and a later commission provided for jurisdiction over the natives and the adjustment of disputes between British and French settlers as regards landed property. Pop. estimated at 70,000, of whom a few hundreds are whites.

New Jersey, one of the middle Atlantic States of the American Union, bounded on the N. and N.E. by New York, on the E. by the Atlantic, on the S. by Delaware Bay, and on the W. by Delaware and Pennsylvania. It covers an area of 7,514 square miles. Staten Island lies off its north-eastern shore. The Blue and Highland ranges on the north-west are the hilliest part of the State, though even there no point exceeds 1,800 feet in altitude, the rest of the surface being flat or gently undulating. The State is well watered. Apart from the boundary rivers Hudson and Delaware, the principal streams are the Passaic, Raritan, Millstone, Rancocas, Great Egg and Maurice. The coast line is nearly 500 miles in extent, and on the east is broken by a countless number of great and small bays, many of which are protected by barrier-island beaches. The Palisades of the Hudson,

Passaic Falls, and Delaware Water Gap are famous natural features. Iron and copper ores are the chief minerals, and slate and sandstone are extensively quarried. Agriculture is carried on vigorously. Potatoes, Indian corn, oats, wheat, hay, and sweet potatoes are the principal crops. Market gardening flourishes, while all kinds of fruit and flowers are cultivated on the grand scale, owing to the proximity of New York, Philadelphia, and other populous towns. Every branch of dairy produce is also of first-rate importance, and the rearing of live stock is a profitable occupation. The leading industries comprise silks, textiles, foundry and machine-shop products, petroleum refining, iron and steel, brewing, tanning, chemicals, tobacco and pottery. The fisheries (including oysters) are of growing value. Among the foremost educational seats are Princeton College, Rutgers College at New Brunswick, Stevens Institution of Technology at Hoboken, and Drew Theological Seminary at Madison. The largest towns are Newark (246,070), Jersey City (206,433), Paterson (105,171), Camden (75,935), Trenton, the capital (73,307), and Hoboken (59,364). The first settlement was made at Bergen by the Dutch in 1617. The struggle for the Delaware country went on between them and the Swedes and English during the succeeding years, but the last named finally obtained the country. In 1664, James Duke of York, who had received a grant, regranted it to Lord John Berkeley and Sir George Carteret, one condition of the grant being the assumption of the name New Jersey. The proprietors afterwards divided the country into East and West Jersey, both falling into the possession of William Penn, and both ultimately being surrendered to the Crown and constituted as one colony. The Governor of New York was also Governor of New Jersey till 1736, when the latter secured its own royal Governor. New Jersey took an active part in the Independence War and was one of the original States. Pop. (1900), 1,883,669.

New Jerusalem Church. [SWEDENBORG.]

New Lanark, a village of Lanarkshire, Scotland, $1\frac{1}{4}$ miles S.W. of Lanark, charmingly situated on the right bank of the Clyde, near Corra Linn and opposite the small fall of Dundaff. It is noted as a seat of the cotton industry conducted for many years in circumstances of exceptional interest. David Dale (1739-1806) opened the first mill in 1785 at this spot, which Sir Richard Arkwright had said might be transformed into the Manchester of Scotland. In 1799 the concern was sold to a Manchester company, who appointed Robert Owen (1771-1858) as their manager. Under his beneficent control the mills became one of the industrial show-places of Scotland, 2,000 persons visiting them annually. The Grand Duke Nicholas (afterwards Tsar Nicholas I.) when he saw them, offered to remove 2,000,000 of the surplus population of England and found a Russian New Lanark under Owen. With Owen's retirement in 1827 his socialistic experiments gradually lapsed, but the mills were carried on. Pop. (1901), 795.

New London, a seaport of Connecticut, United States, on the right bank of the Thames, near the mouth of Long Island Sound. It was originally known as Pegmot Harbour. During the American War it was the headquarters of the Connecticut privateering fleet, and in 1781 was captured and burned. It is now a fashionable summer watering-place. Formerly it was a whaling port, and is still engaged in sealing and fisheries. The principal manufactures include silks and woollens, besides shipbuilding and oil-refining. Usually the Yale and Harvard University boat-race is rowed on the Thames at New London. Pop. (1900), 17,548.

Newman, FRANCIS WILLIAM, scholar and author, and younger brother of Cardinal Newman, was born in London on June 27th, 1805. He gained a double first at Oxford, but in 1830 resigned his Balliol fellowship from conscientious motives, and travelled in the East. Returning to England in 1833, he identified himself with the Nonconformists, and in 1840 became professor of classical literature in Manchester New College (now in Oxford). In 1846 he was appointed professor of Latin in University College, London, and held that post for 23 years. Meanwhile his interest in theology continued as strong as ever, and among his numerous books were *The Soul: its Sorrows and Aspirations* (1849), *Phases of Faith* (1850), *Theism: Doctrinal and Practical* (1858), *A Dictionary of Modern Arabic* (1871), and several classical translations and other works in various departments of learning. In 1879 he was made a vice-president of the British and Foreign Unitarian Association. He belonged to the advanced school in politics, was opposed to vaccination and vivisection and a pronounced vegetarian. After his brother's death he published *Contributions chiefly to the Early History of the late Cardinal Newman* (1891), which caused some sensation. He died at Weston-super-Mare on October 4th, 1897.

Newman, JOHN HENRY, Cardinal, was born in London, where his father was a banker, on February 21st, 1801. He was educated at Trinity College, Oxford, where his career was shortened by his father's failure. In 1822 he was elected fellow of Oriel and in 1824 curate of St. Clement's, Oxford. In 1828 he was presented to the vicarage of St. Mary's, Oxford, the University Church. Breaking with the Evangelical party, he resigned the tutorship of Oriel, which he had held for six years, and went on a Mediterranean tour with Hurrell Froude, during which he nearly died of fever and wrote his hymn, *Lead, kindly Light*. On his return he joined the Tractarian, otherwise called the Oxford, movement, of which he immediately became one of the foremost leaders, writing several books in defence of Anglo-Catholicism. Newman was the author of the celebrated *Tract XC.*, published in 1841, demonstrating that the Thirty-nine Articles were not opposed to Catholic teaching but only to Roman dogma and dominant error. In 1842 he retired to Littlemore for prayer and seclusion, and next year resigned the vicarage of St. Mary's. In October 1845 he was received

into the Catholic Church, and in October 1846 went to Rome, where he was ordained priest and created D.D. After his return to England he established the Oratory at Birmingham (1847-9), and in 1849 published his *Discourses to Mixed Congregations*, his finest volume of sermons. In the course of his *Lectures on the Present Position of Catholics* (published in 1851), he had reflected on the character of Father Achilli, and in the following year was fined £100 in the libel action, although he was held to have proved his case. From 1854 to 1858 he was Rector of the Catholic University in Dublin, and in 1859 established at Edgbaston a school for the sons of Catholics of the upper classes. In 1864 appeared his famous *Apologia pro Vita Sua*, in reply to Charles Kingsley's assertion that "Father Newman did not consider truth a necessary virtue." In answer to Mr. Gladstone's pamphlet on the Vatican Decrees, Newman published a *Letter to the Duke of Norfolk* (1875), in which he agreed that the civil allegiance of Catholics was not affected by Papal prerogative. In 1877 he was elected honorary fellow of Trinity College, Oxford, and on May 12th, 1879, was created Cardinal of St. George in Velabro. He died at Edgbaston on August 11th, 1890. His *Dream of Gerontius* (1865), his most considerable essay in pure literature, acquired posthumous fame when set to music as an oratorio by Sir Edward Elgar in 1900.

Newmarket, on the borders of Cambridgeshire and Suffolk, England, 13 miles E. by N. of Cambridge. It has been called the "racing capital of England." The chief buildings are the Jockey Club-house, the Subscription Rooms, the Admiral Rous Memorial Hospital, and St. Mary's and All Saints' Churches. The town is dependent on horse-racing, which has been established here since the beginning of the 17th century. The racing-ground is on the heath to the west of the town and is owned by the Jockey Club—which purchased their share in 1750—and the Duke of Rutland. Of the several courses the longest is 4½ miles round. There are training establishments also and a fine training ground. Of the events held annually at Newmarket the most important are the Two Thousand Guineas at Easter (established, 1809), and the Cesarewitch in October (established, 1839). Pop. (1901), 10,686.

New Mexico, a south-western Territory of the United States, bounded on the N. by Colorado, on the E. by Oklahoma and Texas, on the S. by Texas and Mexico, and on the W. by Arizona. It occupies an area of 122,460 square miles. Most of the country lies at an elevation of from 3,000 to 6,000 feet above the sea, the highest mountains being the Sierra Blanca in the south (14,269 feet). The Rio Grande del Norte, entering from Colorado, roughly bisects the Territory. It is the chief river, other streams being the Pecos, Puerco, the Chaco, and the Gila. The mineral wealth of New Mexico is very great, gold, silver, copper, lead, iron being extensively mined, while mercury, zinc and manganese occur, and the coalfield is considerable.

Agriculture flourishes, stock-raising being a profitable pursuit and the wool-clip large. The chief crops are wheat, maize, oats, hay, potatoes, and sugar-beet. All fruits of the temperate zone grow well and the vine yields a wine of esteemed quality. The climate is of the best and the rainy season short. The principal industries are connected with the milling of grain, lumbering and timber products, and the repair and upkeep of railways. The Navajo Indians are adepts in blanket-making, and the Indians of the Pueblos (communal villages) produce coarse pottery. Santa Fé, the capital (5,603), one of the oldest towns in the United States, and Albuquerque (6,238), are the largest towns. New Mexico was conquered before the end of the 16th century by Spaniards, who retained it till the revolt of Mexico in 1822. After the war with the United States (1846), Mexico surrendered land equivalent to New Mexico, part of the present Nevada and Colorado and most of Arizona (1848). The Territory was organised in 1850-1. In 1854 a large strip in the south was acquired by purchase from Mexico. Arizona was constituted in 1863 and, four years later, a portion in the north-east was added to Colorado. Pop. (1900), 195,310.

Newnham College, a women's college at Cambridge. It is composed of the Old Hall, Sidgwick Hall, and Clough Hall, presided over by a lady principal and two vice-principals. Newnham Hall was built in 1875. Newnham has a library, a laboratory, and gymnasium, and is well endowed with scholarships. Since 1881 the students have had the privilege of entering for the tripos and previous (or "Little-go") examinations of Cambridge University, in which they have several times earned distinction.

New Orleans, a river-port and the largest city of Louisiana, United States, and the commercial metropolis of the Gulf States, on the Mississippi (mainly on its left bank), 106 miles from the Delta. Canals connect with Lake Pontchartrain, 5 miles north, and this in turn, by the Rigolets, with Lake Borgne and the Gulf, so that New Orleans possesses two waterways to the Gulf of Mexico. As the land on which the city stands is a few feet below high water mark, the stream is banked by levees, or dykes, 14 feet high and 15 feet wide, which form favourite promenades. Owing to its situation the drainage of the city offered great difficulties, but by the use of powerful steam-pumps sewage and water are conveyed to Lake Pontchartrain. The climate is moist and warm, but by assiduous care for the public health the death-rate, once as high as 59 per 1,000, does not now exceed 29 per 1,000. Though the city contains few magnificent structures, its aspect is picturesque and "foreign-like," owing to the preservation of so many of the buildings of Spanish and French days with their gay colours and bizarre design. The "faubourgs" above

and below the old city (built on the bend of the river and so named the "Crescent City") are more American in style and habit. The principal edifices are the Custom-house, the Cathedral of St. Louis, the Archbishop's Palace, the Supreme Court (once the Spanish city hall), Tulane University (which absorbed Louisiana University and was named after Paul Tulane, who founded it in 1884), the Sophie Newcomb Memorial College for women (founded in 1886), and the Charity Hospital. The manufactures include machinery, cotton goods, cigars, beer, boots and shoes, sugar, cotton-seed oil, and timber products. Excepting Liverpool, New Orleans is the greatest cotton mart in the world. Its shipping business is enormous. The port carries on a huge export trade for the vast extent of country drained by the Mississippi and its affluents; but, as much produce is brought down in flat-bottomed vessels which do not return, the imports are not nearly so large as the exports, which comprise cotton, wool, sugar, rice, grain, hides, tobacco, pork and lard, fruit and timber. New Orleans was settled in 1718 by the French, who ceded it (with Louisiana) to the Spaniards in 1763. Re-conveyed to France in 1800, it passed to the United States when Louisiana was purchased in 1803. In 1815 the British were dashing defeated by General Andrew Jackson. In 1836, owing to ill-feeling between the Creoles and Americans, the city was divided into three municipalities, but consolidated into one in 1852. The Federals captured it in 1862. Feeling in a population composed largely of negroes and persons of French and Spanish descent sometimes breaks out into lynching and other riots. Pop. (1900), 287,104.

Newport, a town of Monmouthshire, England, forming with Monmouth and Usk a parliamentary borough, on the Usk, 4 miles from its mouth. It has a large shipping trade, exporting coal, iron and manganese. The principal manufactures are brass and iron, indiarubber and gutta-percha, and railway and telegraph plant. The Church of St. Woollos and the town hall are fine buildings. Pop. (1901), 67,290.

Newport, the capital of the Isle of Wight, on the Medina, situated near the centre of the isle, 10



Photo]

CARISBROOKE CASTLE.

[Chester Vaughan, Acton, W.

miles S.W. of Ryde. St. Thomas's Church contains a fine monument by Marochetti, erected by Queen Victoria to the memory of the Princess Elizabeth, daughter of Charles I. There are also a town-hall, museum and institute, free grammar school, barracks, and a reformatory. One mile south-west is the noble ruin of Carisbrooke Castle, where Charles I. was a prisoner and in which his daughter Elizabeth died. Pop. (1901), 10,911.

Newport, capital of Campbell county, Kentucky, United States, on the Licking, at its confluence with the Ohio, opposite Cincinnati. It is an important industrial centre and has iron and brass foundries, rolling and flour-mills, and engineering works. Pop. (1900), 28,301.

Newport, a seaport and capital of Newport county, Rhode Island, United States, on the south-western shore of the island, in Narragansett Bay, 70 miles S. of Boston. It is the most fashionable watering-place in the United States, owing to the exceptional facilities which it offers for yachting and other seaside recreations, as well as its delightful climate and pleasant environs. The harbour is protected by forts of great strength. Bishop Berkeley, the philosopher, spent two years here (arriving in 1729), and Trinity Church, in which he sometimes preached, still stands. Redwood Library has some pictures in addition to thousands of volumes. The state-house and city hall belong to the 18th century, and the synagogue (1762) claims to be one of the oldest in the United States. In Touro Park is the Round Tower, or Old Stone Mill, alleged to have been built by the Norseman, which inspired the "Skeleton in Armour," by Longfellow. Settled in 1639, Newport was an important commercial centre, but suffered greatly in the War of Independence, during which its trade went to New York. Its industries include cotton, brass-founding, and lead and fish-oil works. Till 1900 it was one of the capitals of the State. Pop. (1900), 22,034.

New Red Sandstone, a name at one time generally applied in Great Britain to those red sandstones, breccias, loams, and limestones which overlie the Coal Measures or other Carboniferous rocks, generally unconformably. They were termed "new," as being more recent than the coal-bearing beds, in contradistinction to the Old Red Sandstone, which is older than those beds. Though largely reddened by iron oxide, their other bright tints gained for them the name of Poikilitic ("variegated"); but the work of Sir Roderick Murchison and his colleagues showed that they are made up of two distinct series—one, now known as Permian, showing more affinity in its fossils to the underlying Palaeozoic rocks, and the other, now known as the Trias, similarly more closely related to the overlying Secondary rocks. Though in Great Britain no marked boundary line can be drawn between these two series, elsewhere they are often unconformable.

Newry, a town and seaport, mostly in County Down, but partly in Armagh, Ireland, 5 miles from

Carlingford Lough, with which it is connected by canal, and 34 miles S.S.W. of Belfast. The chief industries are iron-founding, flax-spinning, tanning, rope- and sail-making, and there are granite quarries in the vicinity. It does a considerable shipping trade with Glasgow and Liverpool. The town dates from the 12th century, and its castle was captured in 1318 by Edward Bruce, King of Ireland, shortly before his death. Pop. (1901), 12,587.

New South Wales, the oldest State of the Australian Commonwealth, occupying the south-eastern corner of the island, bounded on the N. by Queensland, on the E. by the Pacific, on the S. by Victoria, and on the W. by South Australia. It occupies an area of 310,700 square miles and has a coast line from Point Danger in the North to Cape Howe in the south of 750 miles. The Australian Alps, running north and south at a distance from the sea varying from 25 to 120 miles, form the chief mountains. In the north they are known as the New England Range (highest point, Ben Lomond, 4,987 feet); to the south-west of this lies the Liverpool Range (Oxley Peak, 4,495 feet, highest point); west of Sydney rise the Blue Mountains (Mount Beemarang, 4,100 feet, highest point), in the limestone of which, on the western slopes, are the famous Jenolan Caves with their beautiful displays of stalactites; and in the extreme south occurs the Muniong Range, attaining, in Mount Kosciuszko (7,336 feet) and Mount Townsend (7,352 feet), on the border of Victoria, the loftiest summits in the continent. The principal rivers are the Darling, with many affluents, in the north, and the Murrumbidgee with its main tributary the Lachlan, in the central plains, all flowing into the Murray, which separates the State from Victoria. The characteristic flora includes the eucalyptus and the mallee scrub of the plains, and the fauna, the monotremes, marsupials and several birds, such as the emu, the "laughing jackass" (a kingfisher), the lyre-bird and the bower-bird. The climate differs remarkably, the rainfall in the coastal districts varying from 40 to 75 inches a year, while in the plains it may be as small as 5 inches. The great wealth of the country consists in its flocks and herds, with which, however, occasional severe droughts play terrible havoc. Though grain and roots are of secondary importance to pasture, yet good crops of wheat, maize, oats, barley, potatoes, and lucerne are yielded, while the sugar-cane, tobacco, the vine, oranges and other fruits are cultivated. The mineral resources are of enormous value and comprise gold, silver (the Broken Hill lode being the richest deposit), lead, zinc, tin, copper and coal. Diamonds and opals are found in considerable quantities. The trade, both import and export, is greater than that of any other Australian State, the exports being mainly wool, gold, coal, meat (frozen and preserved), hides and skins, leather, tallow, silver and other metals, grain, and dairy products. The industries are mostly those connected with trading requirements, but shipbuilding, machinery, textiles, carriage-building, pottery, brewing, and distilling, the making of soap, candles, and oils are all important. The State is administered

by a Governor (appointed by the Crown) and Cabinet, an Upper House or Legislative Council, and a Lower House or Legislative Assembly. Parliament is triennial and members of the Lower House are paid. The State elects six senators and 26 members of the House of Representatives to the Federal Parliament. New South Wales was visited and so named (from a fancied resemblance to the northern shores of the Bristol Channel) by Captain Cook in 1770, utilised as a convict settlement from 1788 till 1839, and included West Australia (till 1829), South Australia (till 1836), Victoria (till 1851), and Queensland (till 1859). Gold was first discovered in the country in 1851. The Colonists sent contingents to the Soudan War in 1885 and

news of the previous day only. They are therefore in a category different from that of the weekly paper, which summarises the week's news.

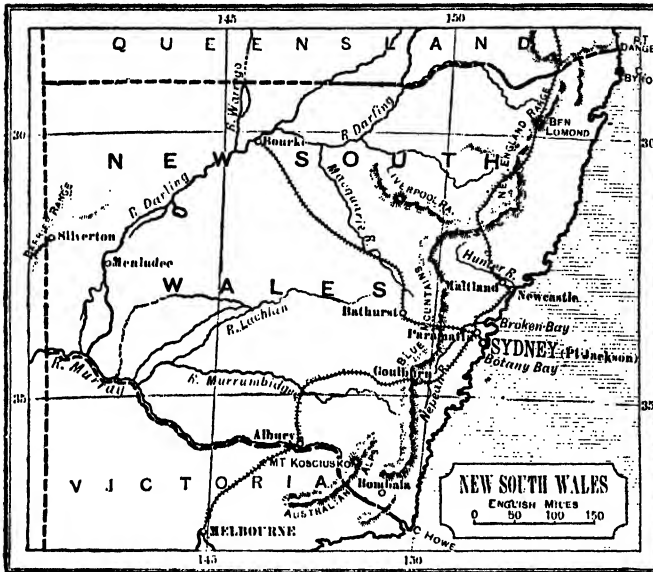
A forerunner of the newspaper may be found in the *Acta Diurna* officially compiled in Rome during the Empire for deposition in the State archives. Copies of these "daily occurrences" were occasionally circulated. The most striking instance of the antiquity of the newspaper is afforded by the publication by the Chinese government of *Tehing-pao*, i.e. "News of the Capital." This paper, generally known as the *Peking Gazette*, is said to date from the 10th Christian century, and has been published daily for several hundred years.

The modern newspaper does not trace descent

from this Oriental source, but owes existence to the invention of printing in Europe. Its true begetters were the printed broadsheets chronicling some one important piece of news—such as the discovery of America—which were hawked in the streets of German cities towards the end of the 15th century. In the middle of the 16th century the Venetian Republic had *notizie scritte*—written records of public events—exhibited in places where they could be read on payment of a *gazetta*. The *notizie* were afterwards printed and were named after the coin originally charged for their perusal. (Hence comes the word "Gazette" as a name for newspapers.) A great advance in the systematic publication of news was made in 1615 by the appearance of the *Frankfurter Journal*, printed weekly at Frankfort-on-the-Main. This paper soon had rivals. The *Nieuwe Tijdinghen* appeared at Antwerp in 1616; the *Weekly News* was published

in London in 1622; and in 1631 there was printed in Paris the first number of the still existing *Gazette de France*. This last-named paper owed its origin to Cardinal Richelieu, and to its early numbers Louis XII. was a frequent contributor.

The development of the newspaper is best studied, however, by following the fortunes of the press of Great Britain and Ireland. MS. news-letters and printed news pamphlets were fairly common in England during the 16th century. The most prominent publishers of these news-sheets—Nathaniel Butter, Nicholas Bourne, and Thomas Archer—were the men who founded the *Weekly News*. This paper, which ceased to appear in 1639, was chiefly concerned with foreign affairs. In 1641 was published a paper which described "the Heads of several Proceedings in both Houses of Parliament." Though called *Diurnal Occurrences*, it usually appeared but once a week. Within two years there



SKETCH MAP OF NEW SOUTH WALES.

to the Boer War in 1899. In 1901 New South Wales formed an original State of the Commonwealth of Australia. The principal towns are Sydney, the capital (pop. 487,900), Broken Hill (27,500), Newcastle (12,988), Paramatta (12,560), Goulburn (10,612) and Maitland (10,073). Pop. of the State (1901), 1,359,133.

Newspapers, papers or prints containing a record of and comment upon current events and appearing at intervals of not longer than a week. Newspapers are divided broadly into two classes—the daily and the weekly. In the United Kingdom the "daily" paper is not issued on Sundays; in the United States, and in France and several other European countries, the daily paper is generally published on Sundays as well as week-days. In London and some other large cities certain papers are published exclusively on Sundays and give the

was printed the first of a number of *Mercuries*, whose writers received information from the Cromwellian government. With the *Public Intelligencer* (1655) they were the forerunners of the official publications—the *London Gazette* (1665), the *Edinburgh Gazette* (1690), and the *Dublin Gazette* (1705). The *London Gazette* was first published in November, 1665, when the Court was at Oxford in consequence of plague in London. The first twenty-three numbers were called the *Oxford Gazette*.

It was not until 1673 that the papers discovered what has become their main source of revenue—the regular insertion of advertisements at a fixed tariff. The journal which first stated its readiness to print such announcements was the *Index Intelligencer*. Advertisements speedily increased the popularity of newspapers, which, at the opening of the 18th century, began to exercise a powerful influence on public affairs. In 1703—the year after the accession of Queen Anne—appeared in London the *Daily Courant*, the first English daily newspaper to achieve success. The *Courant* was expressly stated to be simply a record of news, the publisher—somewhat rashly—"supposing other people to have sense enough to make reflections for themselves"; but it was otherwise with *The Review*, issued by Daniel Defoe in 1704. Defoe made the *Review* a vehicle for his political opinions. The example thus set was quickly imitated. From that day the newspaper became the favourite organ for the politician, and, from discussion of politics, criticism of every other topic of interest naturally developed. With their growth in power, the newspapers became a source of anxiety to the governing classes. A censorship, established in 1662, had been repealed in 1695, but new measures were now adopted. For a time a tax was placed on advertisements, while, in 1712, a law was enacted putting a tax of 3d. on newspapers of "half a sheet or less," and of 1d. on larger publications. This did not prevent frank and often virulent criticism of public men, which led, especially after the accession of George III. (1760), to frequent prosecutions for criminal libel, and papers were often edited from Newgate or other jails. In 1765 the newspaper tax was raised to 1½d., and during the Napoleonic wars successive additions brought the tax on a single copy to 4d. By this time the cost of a paper to the public—in the 17th century, ½d. or 1d.—had risen to 6d. or 7d. This state of affairs led to the printing of many unauthorised papers—generally of a seditious or vicious type—and to constant prosecutions for publishing unstamped journals. Through the exertions of Lord Lytton (the novelist) the tax was reduced in 1836 to 1d. In 1855 it was entirely abolished, while the repeal in 1861 of the duty on paper gave the United Kingdom at length a "free press."

By that time the status of the newspapers had completely altered. A prolonged struggle for liberty to report the proceedings in Parliament had ended in 1771 in a tacit victory for the press, though the legal right to report speeches has not, even yet, been obtained. Papers famous in their day had ceased to appear. Of these two demand mention—the *Public Advertiser*, in which were

printed (1768–1771) the letters of Junius, and the *North Briton*, the organ of John Wilkes, who was cast into the Tower for his criticism of the King's speech in the issue of 23rd April, 1763. But several of the best-known journals of to-day had taken their place. Of London papers the *Morning Post*, to which the poet Coleridge was an early contributor, was first published in 1772; the *Morning Advertiser* (the property of a body of licensed victuallers) in 1794, and the *Globe* in 1803. In Scotland there were the *Glasgow Herald*, established in 1782, and the *Scotsman* (Edinburgh), first published in 1817; in Ireland the *Belfast News Letter*, dating from 1737, and *Freeman's Journal* (Dublin) from 1763.

On the 1st of January, 1788, a paper established in London in 1785 as the *Daily Universal Register* changed its name to that of *The Times*, under which title it gained the leading place among the newspapers of the world. Its proprietor, John Walter, as the manner of the times was, found his way to Newgate more than once for criminal libel. It was under his son and successor that the journal attained its pre-eminent position. This was in no small measure due to the improvements he made in the means of producing the paper. Up to 1814 all papers had been printed by hand presses—a slow and laborious process. In that year John Walter II., by the perfection of machinery enabling the paper to be printed by steam power, achieved, in his own words, "the greatest improvement connected with printing since the discovery of the art itself." This invention marked, too, the beginning of the period of facilities for the rapid collection and transmission of news by the steamer, locomotive and telegraph wire: advantages quickly seized upon by the purveyors of news, who were helped in this matter by the establishment of agencies to collect and supply information of all kinds. The first agency started was that of the Associated Press of the U.S.A. (1849); the first agency established in England was that of Reuter (1858), which disseminates foreign news. In 1868 the Press Association was formed, chiefly for gathering home news. Other well-known agencies are the Central News, and the Exchange Telegraph Company. The last-named agency was so called because it at first chronicled only the quotations on the London Stock Exchange.

Great attention was also devoted to improving the means of printing. In 1846 Richard March Hoe, an American printer, invented a rotatory press. Some ten years later *The Times* introduced printing from stereotype plates instead of from movable type, and as the plates could be duplicated, it became possible to print more than one copy of the paper at a time. In 1869 the same office set up the Walter press, which printed from a large web of paper on both sides of the sheet. Improvement had meanwhile been made in the Hoe machines. A combination of the Hoe and Walter presses, adopted by *The Times* in 1895, enabled over 36,000 sheets per hour to be printed by each machine. In the setting of type new inventions were also made. Type setting was done entirely by hand until the introduction in 1879 by *The Times*

of a composing machine invented by a German named Kastenbein. This invention has been superseded by other composing machines. The best known are the Linotype, first used in England by an important paper in 1894, and the Monotype.

In the leading newspapers the collection and dissemination of news were increasingly accompanied during the mid-Victorian period by well-informed and fearless criticism of public events. This was conspicuously the case with *The Times* under the editorship (1841-1877) of J. T. Delane, during which period it earned its pseudonym of "The Thunderer." By the letters written by Dr. (afterwards Sir W. H.) Russell in 1855 from the Crimea, that paper also started the system of war correspondence. At this time the reading classes had greatly increased, but the high price still charged for papers (*The Times* in 1855, after the abolition of the newspaper tax, was 4d. a copy, and the *Morning Post* and other papers had similar prices) restricted the sale of the most widely read journals to 50,000 copies daily.

The time for the cheap paper had arrived. The *Daily Telegraph*, first published on 29th of June, 1855, at twopence, was soon afterwards bought by Mr. Joseph Moses Levy (whose family still hold the property), and he, on 17th of September of the same year, brought it out as a four-paged penny paper. In 1858 the *Standard* (first established in 1827 as an evening paper, as the organ of the Tory party) also reduced its price to a penny, an example followed in 1868 by the *Daily News*, an organ of Liberal opinion established in 1846. A low price, combined with an excellent service of news, brought the daily circulation of several of the papers during the Franco-German war of 1870-71 to over 150,000 copies. In 1881 the *Morning Post* (distinctively the organ of Society) reduced its price to a penny, and the *Morning Advertiser* followed suit in 1891. The only daily paper in the United Kingdom which now charges a higher price than the penny is *The Times* (threepence).

With the exception of the *Globe* no London evening paper had enjoyed prolonged life or much influence previously to 1865, which year witnessed the birth of the *Pall Mall Gazette* under the editorship of Frederick Greenwood. This journal at once took high rank as an influence in politics and literature, being, however, a daily review rather than a chronicle of news. It was the parent—through differences in political views between editors and proprietors—of the *St. James's Gazette* (1880) and the *Westminster Gazette* (1893). The *St. James's* was, in 1905, amalgamated with the evening edition of the *Standard*. The *Echo* (1868-1905), another evening journal, was the first London daily published at a halfpenny which proved successful. It was issued by Messrs. Cassell & Co., and its first editor was Mr. (afterwards Sir) Arthur Arnold, whose brother, Sir Edwin Arnold, was for several years editor of the *Daily Telegraph*. The *Evening News* (1881), the *Star* (1888), and the *Sun* (1893) are also halfpenny evening papers.

In 1892 the *Morning Leader* was issued at a halfpenny, but the rise into importance of the halfpenny press dates from 1896, when Mr. Alfred C. Harms-

worth (afterwards Lord Northcliffe) founded the *Daily Mail*. With an equipment as complete as that of its penny rivals, the *Daily Mail* gave its news in condensed form, provided (after the manner of French journals) a serial story, and, in general, adopted a lighter tone than was customary. It was the development in daily journalism of brief, bright, and snappy paragraphs. The success of the *Daily Mail* led to the establishment in 1900, by Mr. C. A. Pearson, of the *Daily Express*, a paper run on similar lines and sold at the same price. The reduction of the price of the *Daily News* and the *Daily Chronicle* to a halfpenny followed in 1904. The *Daily Chronicle* had developed in 1877 out of a local paper called the *Clerkenwell News*, and had been for some years before its reduction to a halfpenny noted for its "literary page" started in 1891, under Mr. A. E. Fletcher's editorship, by Mr. James A. Manson. Their low price had much to do with the very large circulation enjoyed by most of the halfpenny papers. Of the 3,000,000 copies of daily papers sold every day, in London—the approximate figure for 1906—the halfpenny press claimed nearly a half. A feature of journalism connected with the rise of these halfpenny papers was the acquisition by the same proprietary of several journals—town and country—which gives, occasionally, to their political views, a unanimity otherwise inexplicable. This fact apart, the prevailing views of the Press, in 1880 distinctly Liberal, had become, in London particularly, strongly Conservative at the opening of the 20th century. The year 1906 saw, however, the birth of a penny Liberal journal named the *Tribune*.

Class papers need only be indicated: the chief issued daily are the *Financial News*, *Financial Times*, *Sportsman*, and *Sporting Life*. Some record must, however, be made of the rise of picture papers. Occasional illustrations appeared in newspapers from an early date, but the paper which appealed for support primarily on account of its pictures was not known until the publication of the *Illustrated London News* in 1842. This weekly journal attained, by 1855, an average circulation of over 100,000 copies. The *Graphic*, begun in 1869, also depended on its engravings for its existence. Since 1900 both these journals have found a rival in the *Sphere*. Before the last-mentioned date, however, a way had been discovered of transferring the half-tone etching of a photograph to the stereotype plate, and in 1890 the *Daily Graphic* (1d.) had appeared, the first daily newspaper to make illustrations its principal feature. In 1904 appeared the *Daily Mirror*, a picture paper at the price of a halfpenny.

While smallness of population confines the important Scottish and Irish newspapers to a few towns, the case is otherwise in England, where, since the abolition of the newspaper duty, the provincial Press has risen to high importance. Among the best and best-known of these papers is the *Manchester Guardian*, a paper which in the fullness and accuracy of its information rivals *The Times*. The *Birmingham Post* is an influential organ in the midlands, while among the Yorkshire papers the *Leeds Mercury*, founded in 1718, and

now issued at a halfpenny, and the *Sheffield Daily Telegraph* may be mentioned.

The weekly newspapers can be divided into two classes—those papers which give in considerable detail the news of the preceding seven days, and those which are mainly concerned with political and literary criticism. To the second category may be added class journals (e.g. religious, such as the *Guardian*, established in 1846), and *Punch*, founded in 1840, the only successful professedly humorous journal—which is also one of the best of picture papers. In the genre of political cartoons it has a serious rival in those of Sir F. C. Gould in the *Westminster Gazette*. In the first category of weekly papers mention may be made of the *Weekly Dispatch*, founded 1801, *Lloyd's* (1842), which has a circulation of over 1,000,000 copies weekly, the *Weekly Times* (1847), *Reynolds's* (1850), distinguished for its extreme Radicalism, the *People* and the *News of the World*. Allied to this class of journal is the Sunday paper, such as the *Observer*, founded 1792, and the *Sunday Times*, which give simply the news of the previous day. Among critical journals the *Athenæum* (founded 1828), specifically the organ of authors and publishers alike, *Spectator* (founded 1828), and *Saturday Review* may be instanced. All have wielded considerable influence.

Of the foreign Press it may be said that French newspapers are distinguished by the brilliance of their writing, the German papers by the solidity of their information, and that the Press of other European countries reflects one or other of these styles. The American paper is marked by a boldness of treatment and a comprehensiveness which reflect the character of the people. America invented the interview, and, in practice, knows no law of libel. The papers of Canada and Australasia

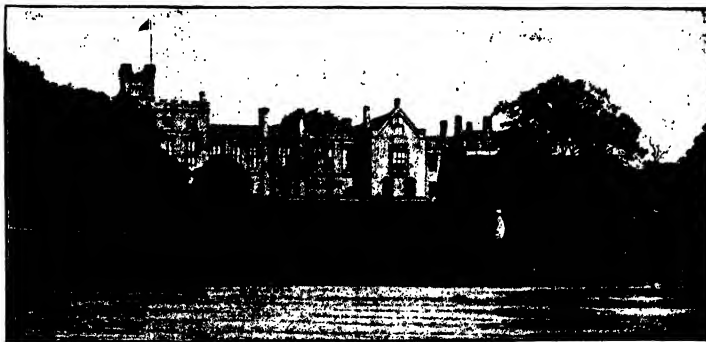
lation" and most hustling of papers. *World*, *Herald* (1835), *Times* (1851), *Evening Post* (1801), no Sunday edition, a paper of an English type as is the *Tribune* (1841), owned since 1872 by Mr. Whitelaw Reid, ambassador (1905) to Great Britain, *Harper's Weekly*, *Collier's Weekly*, *Judge* and *Puck* (humorous); all these are New York papers. The Sunday editions of some of the papers run occasionally to 100 or more large pages and contain coloured illustrations.

FRANCE. *Journal Officiel*, *Figaro* (the organ of Society), *Le Temps* and *Le Matin*, noted for their foreign news service; *Journal des Débats*, *Le Petit Parisien* and *Le Petit Journal*. All are Paris prints. The *Petit Journal*, price halfpenny, is sold in every village in France, its circulation exceeding 1,250,000 copies daily.

GERMANY. The *Reichsanzeiger*, the official organ of the Government, *Berliner Tageblatt*, *Vossische Zeitung*, *Lokalanzeiger* (huge circulation), *Nord Deutsche Zeitung* (all of Berlin); the *Cologne Gazette* (*Kölnische Zeitung*), a very important paper. The *Hamburger Nachrichten* was the organ of Prince Bismarck.

Other notable papers are the *Neue Freie Presse* and the semi-official *Fremdenblatt*, both of Vienna; the *Tribuna* and *Messaggero* of Rome; *El Correo*, *La Epoca*, *El Imparcial*, *El Liberal*, all of Madrid; the *Journal de Genève*; the *Naroe Vremya* (St. Petersburg), *Moskriskae Vedomosti* (1766), and the *Sizi Shimpo* (Tokyo).

Newstead Abbey, situated to the south-west of Sherwood Forest, Nottinghamshire, six miles S. of Mansfield. It was founded by Henry II. in 1170 as a priory of black canons, in atonement for the murder of Becket. At the dissolution of monasteries, Henry VIII. gave it to Sir John Byron, Lieutenant



NEWSTEAD ABBEY.

[Phot.: Wilson, Aberdeen.]

are more American than British in their design—elsewhere in the British colonies the type of paper resembles the average English journal. The names of some of the leading foreign papers are appended. Figures in brackets denote the year of foundation:—

UNITED STATES OF AMERICA. "The largest circu-

of Sherwood Forest. It remained in that family till 1818, when the poet Byron, who had made it his home for ten years, sold it to Colonel Wildman. The beautiful west front, which is the sole remnant of the old Abbey church, is in a late form of Early English, and the fine chapter house is now

used as a chapel. Edward III., Henry VII., and Charles II. all visited it, and the richly tapestried rooms occupied by those kings are still called after them. Thomas Phillips's portrait of Byron hangs in the grand saloon, and in the grounds is a monument to the poet's dog Boatswain. Some relics of David Livingstone are also preserved in the Abbey.

Newt, or **FRT**, an animal belonging to the genus Triton, Tailed Amphibians of the same family as the Salamander. Wallace admits sixteen species, from Europe, except the extreme north, Algeria, North China, and Japan, the eastern States of North America, California, and Oregon. The body is covered with warty tubercles, and there is a series of glandular pores along the lateral line. There are four fingers and five toes, and the male has a back as well as tail crest, the two being sometimes continuous. These ornaments are most conspicuous during the breeding season. These animals frequent ponds and ditches, sometimes leaving the water for the damp marshy ground on the banks. They prey on worms, insects and their larvæ, water-fleas, etc., and even on weaker animals of their own kind. The eggs are attached to water plants, and the young undergo a metamorphosis resembling that of a frog, though a newt tadpole is a beautiful little creature, which cannot be affirmed of the frog tadpole. Six weeks is said to be the normal duration of the metamorphosis; but this supposes a good supply of food, for the period may be greatly prolonged by keeping the newt larvæ on low diet. Three species are British. The Crested, or Great Water Newt (*T. cristatus*), is about six inches long, dusky above, with some spots on the side; the under-surface bright orange dotted with black. This species seldom leaves the water when at liberty. The Common Smooth Newt (*T. punctatus*) is between three and four inches long; brownish above, and orange, with dark markings, on the under-surface. The Palmated Smooth Newt (*T. palmipes*) has the digits of the hind limbs webbed. If newts are kept in an aquarium, an island—of virgin cork—should be provided for them, and the tank must be kept covered, as these animals have an awkward habit of getting out, and when they have made their escape they generally creep into some corner and die.

Newton, a town of Middlesex county, Massachusetts, United States, on the Charles, 7 miles W.S.W. of Boston. It is the seat of Lasell Seminary and the Newton Theological Institute. Its manufactures include cotton, worsted, hosiery, silk, machinery, starch, papers, and chemicals. Pop. (1900), 33,587.

Newton, ALFRED, zoologist, was born at Geneva, Switzerland, on June 11th, 1829, and was educated privately and at Magdalene College, Cambridge. Elected travelling Fellow of his college, he spent much time between 1854-63 in studying the zoology and especially the avifauna of Lapland, Iceland, the West Indies and North America, and in 1864, accompanied Sir (then Mr.) Edward Birkbeck to Spitsbergen. Largely owing to his efforts whilst chairman of the Close-time

Committee, three Acts of Parliament were passed for the protection of birds. In 1866 he was appointed to the chair of Zoology and Comparative Anatomy in Cambridge University, and was Fellow and Royal Medallist of the Royal Society. One of the foremost authorities on ornithology, his scientific works include *The Zoology of Ancient Europe* (1862), *Ootheca Wolleyana* (1864-1905), *Zoology* (1874), and *A Dictionary of Birds* (1893-6), and he was editor of *The Ibis* (1865-70), *The Zoological Record* (1870-2), and *Yarrell's British Birds* (1871-82). He died at Cambridge on June 7, 1907.

Newton, SIR ISAAC, the illustrious natural philosopher, was born on December 25th, 1642, at



SIR ISAAC NEWTON.
(By Van derbank.)

Woolsthorpe Manor, in Lincolnshire, and was educated at the village school and at Grantham. He gave early indications of the tastes and talents which rendered him the greatest mathematician of modern times. His father having died in his infancy, his mother removed him from school to help her with the farm, but after a time he was allowed to return to Grantham, whence he proceeded to Trinity College, Cambridge (1661), where he attended Professor Barrow's lectures and, by private study, carried on John Wallis's researches, and discovered the binomial theorem, while by the end of 1665 he had discovered the method of fluxions. In 1665 and 1666 he was driven from Cambridge by the plague, and while at Woolsthorpe the fall of an apple suggested the grandest of all his discoveries—the law of gravitation. In 1667 he was elected a Fellow of Trinity College, and,

about the same time, discovered the composite nature of light. He was appointed Lucasian Professor of Mathematics in Cambridge University in 1669, and held the chair for thirty-three years. In 1671 he was elected a Fellow of the Royal Society, and became involved in a controversy on his discoveries. He published his great *Treatise on Optics* in 1704, having already, in 1687, published his *magnum opus*, *Philosophiæ Naturalis Principia Mathematica*. In 1689 he became member for the University of Cambridge till next year, when the Convention Parliament was dissolved. In 1692 the results of several years' studies in chemistry were destroyed owing to his pet dog Diamond overturning a lighted candle, a lamentable accident which seriously affected Newton's health and energy. In 1696 he was appointed Warden of the Mint, and rendered great service in the calculations and experiments required for the general recoinage, and in 1699 he became Master of the Mint. In 1701, Newton again represented his university in Parliament, and was elected President of the Royal Society in 1703, a post to which he was re-elected during the remaining twenty-four years of his life, and was knighted in 1705. Though he gave up science for the last ten years of his life, he remained in good health until his eightieth year, after which he gradually succumbed to the stone, and died at Kensington on March 20th, 1727. He was buried in Westminster Abbey, and a splendid statue by Roubiliac was erected in 1755 in Trinity College Chapel. His other published works include *Arithmetica Universalis* (1707 and 1712), *Analysis per Equations Numero Terminorum Infinitas* (1711), and *Methodus Differentialis*. For the controversy with Leibnitz, concerning the priority of the discovery of the differential calculus, or the method of fluxions, Newton was not responsible, but was forced to enter the lists through the injudicious partisanship of friends rather than from any love of disputation; though both philosophers, when entered in the quarrel, conducted it with some measure of acrimony and recrimination. But Newton was transparently honest, and Bishop Burnet described him as the "whitest soul" he ever knew.

Newton, JOHN, hymn-writer, was born in London on July 24th, 1725. After attending school at Stratford for two years he went to sea on his father's ship, was impressed at the age of 17, and, after enduring great hardships, was allowed to exchange into a trader and was concerned, first as mate and afterwards as master, in the slave trade for ten years. He then turned his attention to religion, gave up the sea in 1755, and, while a tide-waiter at Liverpool, prepared himself for ordination. In 1764 he became curate of Olney, where he formed an intimate friendship with the poet Cowper and the philanthropist John Thornton, the latter of whom, in 1780, presented him to the living of St. Mary Woolnoth, London. His earnest preaching and devout conversation had a great influence on the leaders of the Evangelical movement, and, both by evidence before Parliament and by earnest advocacy, he contributed to the eventual

abolition of slavery. Newton wrote for the *Olney Hymns*, published by Cowper in 1779, several hymns that acquired enduring favour, and his other works include *An Authentic Narrative . . . of some Particulars in the Life of . . . John Newton* (1764), *A Review of Ecclesiastical History* (1770), *Cardiphonia* (1781), and *Letters of Omicron* (1774—85). He died in London on December 31st, 1807.

Newton Abbot, a town of Devonshire, England, on the Teign, 6 miles N.W. of Torquay. The principal buildings are the Perpendicular churches of St. Mary, Wolborough, and All Saints, Highweek, the town hall, the Gothic Devon lodge, headquarters of the county masonic fraternity, the market and corn exchange, and St. Augustine's Priory for nuns, originally settled at Louvain. An octagonal granite slab once bore the Market Cross from which was read the Prince of Orange's Declaration to the people of England after his landing in Torbay (1688). The industries include tanning, iron-founding, brewing, flour-making, besides malt-houses, sawmills, and engineering and carriage-building works belonging to the Great Western Railway. Pop. (1901), 12,517.

Newton-in-Makerfield, or NEWTON-LE-WILLOWS, a town of Lancashire, England, midway between Liverpool and Manchester. The industries comprise iron-foundries, printing and stationery works, paper mills, glass-works, collieries, brick-fields, and sugar factories. In connection with the Liverpool Farm Reformatory School, established here in 1859, several acres have been laid out for cultivation as a farm and market garden. At Parkside, close by, William Huskisson, the statesman, was fatally injured by the trains on the occasion of the inauguration (September 15th, 1830) of the Manchester and Liverpool Railway, the first line opened for passenger traffic. Pop. (1901), 16,699.

Newton's Rings. Beautiful colours are observed in soap bubbles, and a similar effect is produced by a thin film of any liquid; when, for instance, a pane of glass is wetted and then rubbed almost dry, or when a drop of oil spreads itself out on the surface of water. When two pieces of glass are pressed together a thin film of air separates them, and coloured rings surround the point of closest contact, the colours of these rings varying as the distance from that point is increased. Sir Isaac Newton was the first carefully to investigate these phenomena; hence they are known as Newton's rings. The production of these colours is due to the fact that interference occurs between light reflected from the upper surface and that reflected from the lower surface of the film. This interference causes the destruction of different-coloured light at different points, and as the light which originally entered the film was white, the colour which is seen by the eye is complementary to the one which is destroyed.

Newton Stewart, a town mostly lying on the right bank of the Cree, Wigtownshire, Scotland, the rest lying on the left side of the river, in Kirk-

cudbrightshire, 6 miles N. of Wigtown. It is one of the most charmingly situated of the smaller Scots towns, and the Douglas Academy and Ewart Institute, both notable schools, have given it great vogue for educational advantages. The principal trade is done in wool, gathered in the surrounding country. Macmillan Hall, a building in the Italian style, was so named after John Macmillan (1670-1753), the founder of the Reformed Presbyterian Church. Pop. (1901), 2,600.

Newtown, a town of Montgomeryshire, Wales, on the Severn, 13 miles S.S.W. of Welshpool. It is the seat of the Welsh flannel industry, established in 1790, and greatly accelerated by the transference hither of the flannel market from Welshpool in 1832. Iron-founding, brewing and tanning are also carried on. The Gothic Church of St. Mary's replaced, in 1847, the old Decorated Perpendicular edifice which, though fallen into decay, was left in a ruinous condition, but the fine rood screen and font of the ancient building were incorporated in the modern structure. Robert Owen, the Socialist, was born at Newtown in 1771, and buried in old St. Mary's. Pop. (1901), 6,500.

Newtownards, a town of County Down, Ireland, finely situated at the Northern end of Strangford Lough, about ten miles E. of Belfast. The principal buildings are the Doric Town-hall, the Courthouse, and the Model School in the Elizabethan style. The industries include flax-spinning, the embroidering and weaving of muslins, and silk-weaving, as well as manufactures of ginghams and handkerchiefs, besides nursery gardening. The quarries at Scrabo, in the proximity of the town, yield stone scarcely inferior to that of Portland. The Marquis of Londonderry has a seat at Mount Stewart, in the neighbourhood, while on Scrabo Hill stands a tower, 130 ft. high, erected by his tenantry to a former marquis. Pop. (1901), 9,110.

New Year's Day, the first day of the civil or calendar year and of the month of January; it is the Feast of the Circumcision, kept as holiday in the Christian countries of the European Continent, but where the Greek Church prevails it falls twelve days earlier than the date generally adopted elsewhere. No matter how the year be reckoned, New Year's Day in ancient times no less than within the Christian period, has usually been observed as an occasion for congratulations and good wishes and for the interchange of presents. In Scotland the day is kept as a national festival, being ushered in, the moment the midnight clocks have ceased striking, with the practice of "first-footing" friends. The scenes at the Tron Kirk in Edinburgh and Glasgow Cross once presented features of almost riotous hilarity. Midnight services are common in many churches and chapels, and Tennyson, in familiar lines, alluded to the custom of ringing in the New Year.

New York, a North Atlantic State of the American Union, popularly called the "Empire State," bounded on the W. by Pennsylvania, Lake

Erie, Niagara River, and Lake Ontario, on the N. by the St. Lawrence and Quebec, on the E. by Lake Champlain, Vermont, Massachusetts, and Connecticut, on the S.E. by the Atlantic, and on the S. by New Jersey and Pennsylvania. It includes Long Island, Staten Island, and Manhattan, besides many smaller islands in tidal waters, as well as islands in the Niagara, St. Lawrence, Lake Ontario and Lake Champlain. Its total area is 49,120 square miles. Hilly in the north and east, the rest of the surface partakes of the character of plateaus, passing by terraces and plains down to the margin of the great lakes. North of the Mohawk Valley lie the Adirondacks (Mount Marcy, 5,345 feet), farther south are the Catskills (Slide Mountain, 4,205 feet), the Highlands of the Hudson (Beacon Hill, 1,635 feet), which are part of the Appalachian system, and the Shawangunks (Sam's Point, 2,000 feet). The chief rivers are the Hudson, the St. Lawrence, Mohawk, Oswego, Genesee, Alleghany, Susquehanna, Delaware, Black, Walkkill, and many more. Besides the boundary lakes and innumerable sheets of fresh water in the north, the other better-known lakes include Chautauque, noted for the assemblage of students that gathers every summer on its shores, Seneca, Cayuga, Oneida, and George, which is famous for its scenery. The Falls of Niagara form the most celebrated of all the natural features. In some respects the mineral wealth is very remarkable, comprising as it does iron ore, salt (the state being the richest in the Union), and petroleum and natural gas. There are quarries of marble, flagstone, sandstone, limestone and slate, while lime, gypsum, cement (half of the United States output), and aluminium are produced, of the last practically the total yield of the Union being turned out at the works at Niagara Falls and Massena Springs. The principal crops are maize, oats, wheat, barley, rye, hay and potatoes. Tobacco and hops are also successfully grown, and in dairying (especially cheese, butter and milk) certain districts do an enormous business. The milch cattle exceed 1,500,000 in number, and of grazing kine there are more than a million. The wool-clip is also very large. The manufactures are extremely varied, the more important industries being concerned with clothing, foundry and machine-shop products, textiles, sugar-refining, printing and publishing, beer and spirits, tobacco, chemicals, hosiery, flour, boots and shoes, leather, electrical plant, and paper. The lake, river and sea fisheries are extensive, and the rendering of fish for oil and guano is a profitable industry, while oysters are cultivated in the waters of the New York region. Albany (94,151) is the capital, and among the biggest and most influential cities are New York, Buffalo, Rochester, Syracuse, Troy and Utica. The leading educational institutions are Columbia and New York Universities in New York City, Cornell University in Ithaca, and the Universities of Rochester, Syracuse and Buffalo, while Vassar College at Poughkeepsie and Bernard College in New York are the chief colleges for women. The country was originally peopled by the Iroquois and Algonquin Indians. In 1609, Henry Hudson explored New York Bay and Hudson River, naming

the country New Netherland, and in the same year Samuel de Champlain, the French navigator, discovered the lake named after him. The Dutch established themselves on Manhattan in 1613, founding a few years later the town of New Amsterdam, which ultimately was captured by the English and by them called New York. In the fighting of the colonial period the Iroquois sided with the settlers, but they assisted the British in the Revolutionary struggle. The State held out obstinately for the mother country, and its soil was the last to be abandoned by George III.'s forces.

on the S. by Upper New York Bay, and on the W. by the Hudson, the famous Palisades of which face the upper part of the city. On the Hudson the city has a frontage of $13\frac{1}{2}$ miles, and of 8 miles on East River, the island having an average breadth of $1\frac{1}{2}$ miles and an area of 21 square miles. Roughly speaking, the city is laid out in avenues, about 250 yards apart, running north and south, which are crossed at right angles by streets at intervals of 80 yards. The more notable thoroughfares are Broadway; Wall Street, the focus of finance; Park Row, headquarters of several of the leading news-



BROADWAY, AT THE INTER-SECTION OF FIFTH AVENUE, NEW YORK.

New York was one of the thirteen foundation States, and its constitution is a revision (1894) of the constitution adopted in 1846. Pop. (1703), 20,665; (1800), 589,051; (1900), 7,268,012, of whom nearly one-fourth were foreign-born.

New York City, the commercial metropolis of New York State and of the United States, and, excepting London, the most populous city in the world, occupies Manhattan Island, Staten Island, portion of Long Island, and parts of New Jersey State and of the mainland on the northern side of the Harlem River, and lies 10 miles from the Atlantic. Since 1897 this area has been designated Greater New York, but the New York of popular speech is usually limited to the boroughs of Manhattan (the whole island) and the Bronx on the mainland beyond the Harlem. Manhattan Island is bounded on the N. by Harlem River (a waterway and not a stream) and Spuyten Duyvil Creek, on the E. by East River (also a strait and not a river),

papers; Fifth Avenue, part of which contains the mansions of Society and the millionaires; Madison Avenue, another select residential quarter; Sixth Avenue, where retail trade is brisk; Third Avenue, described as the longest business thoroughfare in the world; and Washington, Union, and Madison Squares. The public parks and open spaces include Central Park, of 862 acres (containing the Cleopatra Needle conveyed from Egypt in 1881); Bronx Park, of 662 acres, accommodating zoological collections; Pelham Bay Park, of 1,756 acres; Van Cortlandt Park, of 1,132 acres; the Battery and Riverside Drive—a strip of high bank on the eastern side of the Hudson—on which has been erected General Grant's tomb and the Soldiers' and Sailors' monument. The chief buildings comprise the Renaissance Post Office, the City Hall, and many of the structures housing Government offices, educational and artistic institutions and libraries. Higher education is provided by Columbia College (chartered as King's in 1754 and incorporated as

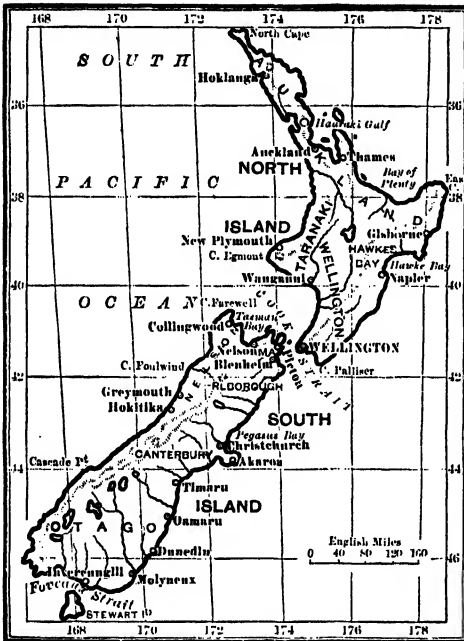
Columbia in 1784), occupying magnificent premises on Morningside Heights; New York University, dating from 1839, once in Washington Square and now lodged in fine buildings on University Heights; Adelphi College, Brooklyn; and Pratt, Packer, and Brooklyn Institutes are also situated in Brooklyn. Cooper Institute, founded in 1857 by the munificence of Peter Cooper, provides free instruction in science, literature, art, and technology. Learned, scientific, and artistic enterprise are represented by the Metropolitan Museum of Art, the American Museum of Natural History, the National Academy of Design, the American Geographical Society, the New York Historical Society, the New York Academy of Sciences, the New York Academy of Medicine, the New York Philharmonic Society, the Carnegie Music Hall, the Astor and Lenox Libraries, and the New York Public Library. The principal churches are St. Patrick's Cathedral (1879), considered the most imposing structure of the kind in the United States, the Cathedral of St. John the Divine (1906), Trinity Church (1846), and St. Paul's (1756), the oldest in the city. The port includes Brooklyn, Jersey City, Hoboken, besides enormous quays on Manhattan, and is estimated to receive two-thirds of the import trade of the country and to discharge one-third of the exports. The leading industries include the manufacture of clothing, cigars, beer, machinery, leather goods, foundry products, jewellery, and electrical appliances, besides sugar refining and printing and publishing. The concentration of business in the lower half of the city (the oldest part of the town) and the difficulty of obtaining land has led to the system of raising buildings on steel frames of from 20 to 30 storeys in height, known as "sky-scrapers." Traffic is carried on by electric cars, electric overhead lines, and underground electric railways, subways, ferries, innumerable river steamers, while the termini of the greater lines of railway are mostly situated in New Jersey City and Hoboken. East River is spanned by four bridges—Brooklyn (opened 1883), Williamsburg (1904), and two others—and Harlem River by several, of which the most noted are Washington Bridge (1890), and the High Bridge (1842), which was erected to carry the old Croton Aqueduct into Manhattan (the new aqueduct being conveyed under the river at a depth of 300 feet). The islands in Upper New York Bay are all turned to account. On Bedloe's Island stands Berthold's colossal bronze statue of "Liberty Enlightening the World," presented by France to commemorate the centenary of American Independence. It is 220 feet high, took two years to erect, and was unveiled in 1886. On Governor's Island (as well as at the Narrows of Sandy Hook) are fortifications, while on Ellis Island is the station where most of the immigrants are examined. The islets in East River are occupied by hospitals, asylums, and houses of detention, Blackwell's Island being the site of one of the penitentiaries. The Italian navigator, Verrazani, is commonly said to have been the first European to make New York Bay, although he effected no settlement. In 1609 Henry Hudson sailed up the Hudson, and in 1614 the Dutch built trading-posts on Manhattan, and

in 1623 established a town which they named New Amsterdam. In 1664 the town was handed over to the British, who were themselves evicted in 1673. Next year, however, the island was definitely ceded to Great Britain and re-named New York in honour of the Duke of York (afterwards James II.). At the period of the Revolution it was held by the British till 1783, and was the seat of Congress from 1785 to 1790, Washington being here inaugurated first President (1789). New York is administered by a Mayor and Board of Aldermen, but the heads of specialised departments (as water, fire, prisons, and so forth) enjoy great power. The problem of government is admittedly intricate, and its reform has been rendered more difficult by the growth of the Tammany system, under which civic rule became a byword for corruption. Pop. (1900) of Greater New York, 3,437,202; of Manhattan and Bronx boroughs, 2,050,600. The area and population may be analysed thus:—

BOROUGH.	AREA. SQUARE MILES.	POPULATION.
Manhattan	21.07	1,850,093
Bronx	39.33	206,507
Brooklyn	65.77	1,106,522
Richmond	77.19	67,021
Queens	123.98	152,099
NEW YORK CITY	307.34	3,437,202

New Zealand, a British Colony in the South Pacific, consisting of North Island (area, 44,468 sq. m.), South (formerly known as Middle) Island (area, 58,525 sq. m.), and Stewart (formerly South) Island (665 sq. m.), besides Auckland, Chatham, Cook and Kermadec Islands, lying from 300 to 1,400 miles distant. The main islands occupy an area of 103,658 square miles. North Island is separated from South Island by Cook Strait, while Foveaux Strait divides South Island from Stewart Island. North Island has been parcelled out into the provincial districts of Auckland, Taranaki, Wellington and Hawke Bay; and South Island into the districts of Marlborough, Nelson, Westland, Canterbury, and Otago. The islands have a shoreline exceeding 4,300 miles in extent, and much of the coast is deeply indented by fjords. The mountain ridges of the group run from south-west to north-east. In South Island, the Southern Alps, culminating in Mount Cook (12,350 feet), are truly Alpine in character, and display glaciation on an extensive scale. Other peaks of this range are Castor (8,286 feet) and Pollux (8,344 feet), Mount Aspiring (9,940 feet), and Mount Tyndall (7,661 feet). In North Island the conspicuous peaks are volcanic, including the extinct cones of Mount Egmont (8,270 feet), near New Plymouth, and Ruapehu (9,195 feet), in the centre of the island, and the active Tongariro (6,458 feet) close by. This is an extraordinary region of hot springs, geysers, and silicious terraces, in many cases of exquisite colouring. In the area somewhat to the south of the Bay of Plenty the far-famed pink and white terraces of Rotomahana and Rotorua were buried beneath the

dust and ashes of an eruption of Mount Tarawera in June, 1886. The largest river is the North Island Waikato, which pursues a north-north-westerly course from Lake Taupo to the sea. This stream is navigable for a considerable distance by river steamers, but the other rivers are torrential. The characteristic flora includes the Kauri pine, which possesses great economic value, beautiful tree-ferns, often 50 or 60 feet high, and *Phormium tenax*, a flax that grows profusely, and is of industrial importance. Among the fauna are the wingless kiwi or apteryx, which is the present-day representative of the extinct moa, and the kea parrot, alleged to have acquired the evil habit of killing sheep in order to peck out the fat of the



MAP OF NEW ZEALAND.

loins, although there seems some reason to believe that this may be calumny. The minerals include gold, silver, lead, copper, antimony, manganese and coal. The gold mines, once more prolific, are not by any means exhausted. The climate is one of the finest in the world, the death-rate averaging 9.5 per 1,000. The soil yields large crops of oats, wheat, barley and potatoes. The sheep runs—of which the vast Canterbury Plains are the most familiar—carry heavy flocks of sheep, the trade in frozen carcasses and wool being the staple of the colony. Preserved meats, hide, skins and tallow, timber, dairy produce, and leather are also exported to a large extent. The manufactures are subordinate to the agricultural, pastoral and mining interests, but include woollens, hosiery, blankets,

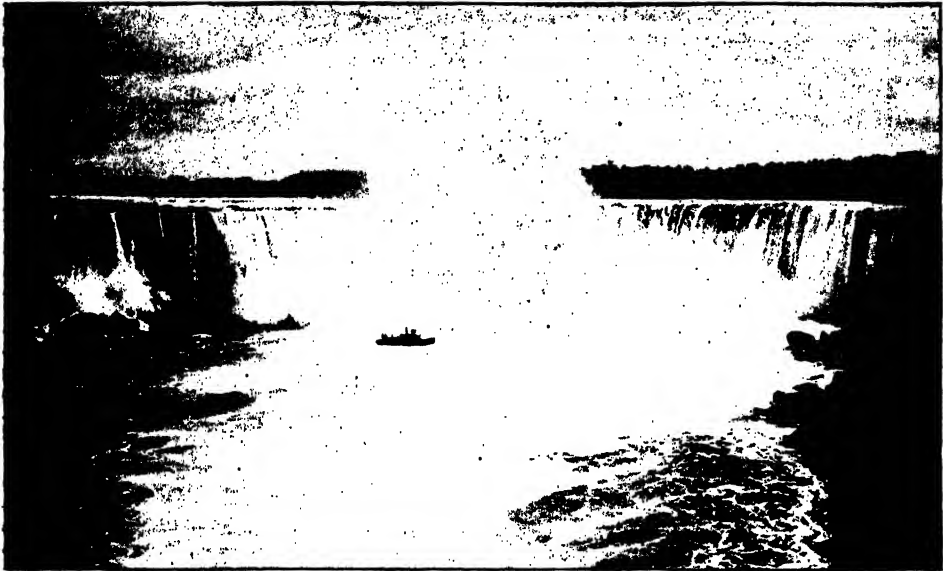
boots and shoes, machinery and tools, biscuits and confectionery, clothing, printing and pottery. Wellington (pop. 43,638) is the capital, and the other important towns are Auckland (34,216), which was the capital till 1865, Christchurch (17,537) and Dunedin (52,390). The principal educational institutions are Otago University in Dunedin, Canterbury College in Christchurch, Auckland University College, and Victoria College in Wellington. The natives, or Maoris, are the finest type of the Polynesians. Tattooing, once universal, is now scarcely practised, and cannibalism, formerly prevalent as a war habit, has not been indulged in since 1843. The custom of their priests in making any person or thing *tapu*, or sacred, gave us the word "taboo." The natives have nearly all become Christianised, and stand contact with European civilisation well. Their melodious tongue lends itself to oratory and song, in both of which they delight exceedingly. Tasman discovered the islands in 1642, and Cook explored them between 1769 and 1777, being the first to make them properly known. European settlers began to arrive in 1814, but colonisation did not become effective for another quarter of a century. In 1840, by the treaty of Waitangi, New Zealand was ceded to the British Crown, and erected into a separate colony from the old colony of New South Wales, with which hitherto it had loosely been connected. Even then the natives did not accept the inevitable without a struggle. Little wars broke out periodically until 1869, since which date peace has prevailed. Respect for their rights and fair dealing at last convinced the Maoris that their interests were safe in the hands of their overlords. Pop. (1901), 815,862, including 43,143 Maoris and 2,857 Chinese.

Next of Kin of a deceased person, those who are next in degree of kindred. The term is frequently used to signify those who are entitled in law to the personal property of anyone who has died intestate. If a widow and children are left, the widow takes a third and the children two-thirds. For a full exposition of the subject in popular language, *Cassell's Family Lawyer* (Book V., chap. 3), may be profitably studied.

Ney, MICHEL, marshal, was born of humble parentage, at Saarlouis, Rhenish Prussia, on January 10th, 1769. He entered the French army as a private hussar, was rapidly promoted by General Kléber, and in 1796, at Kœnig, was made general of brigade. He distinguished himself at Neuwied (1797). As a general of division he commanded on the Rhine in 1799, and helped Masséna to defeat the Russians at Zürich. Ney then gained renown under Moreau. In 1805 Napoleon made him a marshal of the Empire and also Duke of Elchingen after his defeat of the Austrians at that place which led to the capitulation of Ulm. At Jena (1806) and Eylau (1807) he displayed brilliant courage, and his daring at Friedland (1807) was so conspicuous that Napoleon hailed him as "le brave des braves." Differing with Masséna, his superior as to the plan of the Peninsular campaign, he returned to France and remained inactive till

1812, when he was placed in command of the 3rd corps of the Grand Army which invaded Russia. He showed shining valour at the battles of Smolensk and Borodino, and was created Prince of the Moskwa. His conduct during the retreat from Moscow afforded the most striking instance of his genius and bravery. In 1813 Ney marched to Berlin, but was defeated by Bülow. He fought with distinction at Leipzig and Hanau and while contesting the advance of the Allies into France. On the capture of Paris (March 31, 1814) Ney advised Napoleon to abdi-

national name, but are now commonly known as Sahaptins, or Shahaptins, from a Salish (Flathead) word of unknown significance. It is difficult to account for their *sobriquet*, as it is at least doubtful whether they ever practised the habit of piercing the nose. They occupied a wide domain along the Columbia and its affluents as far west as the Cascade Mountains, east to the Bitter Root Mountains, north to about 46°, and south to 44° N. The chief tribal divisions are Chopunnish, Klikitat, Paloos, Tenaino, Tyigh, Umatilla, and Walla Walla. They are estimated at about



THE CANADIAN FALLS, NIAGARA

(Phot. : Thomas Tugby, Niagara Falls.)

cate and, upon the Bourbon restoration, took the oath of allegiance to Louis XVIII. and received a high command in the army. On Napoleon's return Ney marched against him with a considerable force; but, finding that his troops were in favour of Napoleon, Ney joined him at Lyons, and commanded the French left at Quatre Bras (1815), and led with consummate heroism the attack on the British centre at Waterloo, where five horses were shot under him. He fled to Paris, announced that all was lost, and went into hiding, but was discovered, tried for high treason, and—with incredible baseness—was shot in the gardens of the Luxembourg in Paris on December 7th, 1815. He was one of the bravest soldiers that ever fought, and was worthier of a better fate than the death of a cur.

Nez Percés, a Franco-Canadian term applied to a large North American nation of the Columbia basin. They do not appear to have any collective

name, but are now commonly known as Sahaptins, or Shahaptins, from a Salish (Flathead) word of unknown significance. It is difficult to account for their *sobriquet*, as it is at least doubtful whether they ever practised the habit of piercing the nose. They occupied a wide domain along the Columbia and its affluents as far west as the Cascade Mountains, east to the Bitter Root Mountains, north to about 46°, and south to 44° N. The chief tribal divisions are Chopunnish, Klikitat, Paloos, Tenaino, Tyigh, Umatilla, and Walla Walla. They are estimated at about

Ngami, a lake in the interior of South Africa, situated in 23° E. and 20° 30' S. At its most northerly point it receives the Tonke from the north-west, and is drained by the Zuga on the east. The Zuga gradually dwindles for about 200 miles, and then spreads out into a lagoon, and is lost in the sands and by evaporation. Livingstone discovered the lake in 1849. He found it 70 miles in circumference and at an altitude of 2,500 feet. When full it is fresh, but at low water it becomes brackish. In continued drought it is converted into a reed-covered marsh.

Niagara, a river of North America, forming part of the boundary between New York State and the Province of Ontario. The stream issues from Lake Erie, and after a course of 36 miles, during which it effects a descent of 336 feet, flows into Lake

Ontario. About 21 miles from its source Gout Island divides the river into two branches, which pour over a limestone shelf and form the famous Falls of Niagara. The Canadian or Horseshoe Fall with a contour of 2,640 feet makes a leap of 158 feet and the American Fall, with an outline of 1,000 feet, descends about 169 feet. The volume of water pouring over the rock is estimated at 150,000,000 cubic feet a minute, an enormous force, which has been utilised commercially for the transmission of electric power to Buffalo and other towns. It was while attempting to swim the Rapids below the Falls that Captain Matthew Webb, who had already swum across the English Channel, lost his life. Charles Blondin, more fortunate, crossed the Falls on a tight-rope, thrice in 1859 and once in 1860. The river is spanned below the cataract by a suspension bridge, and $1\frac{1}{2}$ miles lower by two railway bridges. The shore on each side of the Falls has been protected by the creation, on the Canadian side, of the Queen Victoria Falls Park (1884; about 154 acres), and on the American, of the New York State Reservation (1885; containing 115 acres). The Falls originally began at Queens-town, seven miles lower down than the present site, and some ingenious geologists have conjectured that in 5,000 years they will cut back to Lake Erie and cease to be. But if the work of recession has already occupied 200,000 years, the Rule of Three, besides trifling physical difficulties, renders this surmise farcical.

Niam-Niam (properly *A-Zandeh*), a large and once powerful Negro nation, south-east Sudan, on the northern affluents of the Welle and generally about the Nile-Congo and Congo-Chad water-partings. The term Niam-Niam applied to them by the Dinkas means "Great-Eaters," and is so intimately associated with the idea of anthropophagy that it has been extended to many other peoples of Central Africa who have no connection with the A-Zandeh beyond their common cannibalism. Despite this universal practice, they are a remarkably intelligent people, who had developed an orderly system of government and established a hereditary monarchy with numerous vassal States in the Welle region probably 200 years ago; but during the latter half of the 19th century the Zandeh empire crumbled to pieces, partly through dynastic wars, partly through intrigues and open attacks of the Arab slave-hunters. After the Mahdist revolt (1883-5) several princes of the royal house set up separate petty States, which have accepted the protectorate of the Congo Free State. Their domain comprises altogether about 50,000 square miles with a collective population of over 2,000,000. The type—round head, broad features, oblique eyes set far apart, dark reddish complexion, long ringlet hair—is so marked that a Niam-Niam can be instantly distinguished from any other native of Africa. While the men hunt and fight, the women till the fields and do most of the hard work. Their weapons are the spear, shield, and cutlass, and much skill and taste are displayed in the production of iron and wood utensils, baskets, earthenware, drums, pipes, and the like.

Nibelungs, or NIFLUNGS, a mythical princely race which furnished the title of the great German epic, the *Nibelungenlied*, the authorship of which is unknown, but which is supposed to be based on popular ballads or sagas and to have been composed not later than the 12th century. They were vanquished and despoiled of their vast treasures by the hero Siegfried, who wins as his bride Kriemhild, sister of Gunther, King of Burgundy, by overcoming for Gunther, the amazon Brunhild of Iceland. Brunhild quarrels with Kriemhild, and persuades Hagen of Tronege to murder Siegfried, Gunther being privy to the crime. Kriemhild then marries Etzel [ATTILA] of Hungary, invites the Burgundians to Etzel's court, and brings about a war between them and the Huns from which none save Gunther and Hagen escape alive; these are captured by Dietrich of Bern, and put to death by Kriemhild, whose revenge is complete.

Nicaragua, a republic of Central America, bounded on the W. by the Pacific, on the N. by the Gulf of Fonseca and Honduras, on the E. by the Caribbean Sea, and on the S. by Costa Rica. It covers an area of 49,200 square miles. The Atlantic shore is mainly a low-lying tract called Mosquito Coast; in the interior occur heights reaching from 5,000 to 7,000 feet above the sea; while towards the Pacific the land falls to the depressions containing Lake Nicaragua and Lake Managua. Some of the hills in the western division are volcanic, partly active. The only river of importance is the San Juan, which drains Lake Nicaragua and reaches the Caribbean Sea after a course of 110 miles. Gold, silver, and copper are the principal minerals. Plants of tropical growth do well, amongst them being indigo, sugar-cane, tobacco, coffee, cacao, bananas, and india-rubber, though rice, beans, and maize are also raised. The largest towns are Managua (pop. 30,000), the capital, Leon (45,000), Granada (25,000), and Masaya (20,000), while the ports on the Atlantic side are Greytown, Bluefields, and Gracias a Dios, and on the Pacific, Cornito and San Juan del Sur. Nicaragua was formerly peopled by Aztecs and a still earlier race. Columbus coasted along the Atlantic face in 1502, and from the time when they subdued the country the Spaniards maintained their hold for 300 years. In 1821 the people asserted their independence and, two years later, joined the federation of Central American States. Since this union was dissolved, in 1839, Nicaragua has been a republic, its history being freely illustrated with a good deal of internecine strife and wars with Costa Rica, Guatemala, and Great Britain (1848). Pop. (1900), estimated at 500,000, mostly Indians, mulattoes and negroes, the whites not exceeding 1,500 persons.

Nicaragua Ship Canal. This engineering project contemplated the construction of an inter-oceanic canal from Greytown at the mouth of the San Juan, on the Atlantic, mainly following the course of the river to its source in Lake Nicaragua, and thence to Brito on the Pacific, by the valleys on the Lajas and Rio Grande. A treaty for this purpose was signed in 1884 by the Governments of

the United States and Nicaragua, a Canal Company was formed in 1889, and work began at Greytown. After several millions had been sunk the United States Congress declined (1893) to guarantee the capital and interest, and owing to want of funds the projectors ceased operations. Though in 1900 and 1901 the House of Representatives passed Bills in favour of the Canal, the Senate threw them out until it was ascertained what was the prospect of the counter-scheme of the Panama route. This outlook appearing to be favourable, the Nicaragua plan was suspended indefinitely. The total length of the Nicaraguan waterway was to have been 170 miles, of which 27 miles would have been excavated. The ascent from the sea at each end would have necessitated the construction of three locks, while the summit level would have been 154 miles long.

Nice (Italian NIZZA), chief town of the department of Alpes Maritimes, France, beautifully situated on the Mediterranean, 15 miles from the coastal frontier of Italy. The Old Town, somewhat squalid, lies round the base of a limestone hill (318 feet high) on which stands the ruined castle; on the eastern side is the port, and on the western the New Town. It is the last-named section which invalids and foreigners affect (whence its *sobriquet* of "the Strangers' Quarter"), for whose benefit it has been laid out in charming walks—the Promenade des Anglais being especially noteworthy—amidst almost sub-tropical surroundings. Amongst the public buildings are the cathedral, the Church of Notre Dame, picture-gallery, museum of natural history, library, casino, and observatory. The chief manufactures are perfumery, liqueurs, tobacco, silk, cotton, paper, pottery, pastes and other preparations of flour, and articles of inlaid wood, mostly olive. Olive-oil is the principal export. Flowers are cultivated on an extensive scale. The ancient Nicæa was founded by a colony of Phœceans from Massilia (Marseille), and passed under Roman rule in the 2nd century B.C. In the 10th century it was held by the Saracens, and afterwards became independent until, towards the close of the 14th century, it admitted the suzerainty of the House of Savoy. Sacked by the Turks in 1543, from 1600 it was frequently seized by the French, who retained it from 1792 till the downfall of Napoleon (1814). It then belonged to the kingdom of Sardinia, by which it was ceded to France in 1860. Garibaldi and Masséna (duc de Rivoli) were natives. Pop. (1901), 78,480.

Nicene Creed. In A.D. 325 the Emperor Constantine the Great summoned a Council at Nicæa, or Nice, a town of ancient Bithynia, a province of Asia Minor, on the eastern shores of the Bosphorus and Strait of Marmora, to decide the controversy that threatened to divide the Christian Church. The Council was attended by three parties—the Arians, who held that the Son, though the highest of created beings and in a sense divine, was yet neither of the same substance with the Father nor co-equal in power and glory; the Athanasians, who stood by the full and orthodox view of the Trinity; and the Eusebians, or Moderates. The orthodox section prevailed. The

tenet of the divinity of the Spirit was added at a Council held in Constantinople in 381. The *Filioque* clause, teaching the procession of the Spirit from the Son, appears to have been introduced in the following century. The Nicene Creed is recited daily in the Communion Office of the Anglican Church and the Mass of the Catholic Church.

Nicholas I., surnamed THE GREAT, a Roman by birth, was Pope from 858 to 867. He was very energetic and ambitious; in 863 he excommunicated Photius of Constantinople, and thus caused the separation between the Eastern and Western Churches. He first founded the claims of the Papacy to universal temporal power on the spurious decretals of Isidore, subjected Lotharius I. to penance, and converted Bogoris (Boris) of Bulgaria, with his people. In the Roman Church he ranks as a saint.

Nicholas II., born at Chevron, in Savoy, formerly Bishop of Florence, was pontiff from 1058 to 1061. He did much to establish the power of the Papacy by giving the election of Pope to the Cardinals and by introducing clerical celibacy. He found a stout champion in Robert Guiscard, Duke of Normandy, who defended his temporal possessions in lower Italy.

Nicholas V., born at Pisa in 1398, succeeded to the Papacy in 1447. His statesmanship was shown in his inducing the anti-pope Felix V. to retire in order to restore the peace of the Church. A patron of learning in a magnificent age, he enriched the Vatican Library and invited scholars to take up their quarters in Rome, hoping not only to render the Eternal City both outwardly splendid, but also to make it the centre of the world's light and lending. He invoked in vain the help of Christendom on behalf of the Greeks, who had submitted to his predecessor, Eugenius IV., and Constantinople fell before the Turks in 1453. Nicholas died two years later.

Nicholas I., Tsar of Russia, was the third son of Paul I., and was born at St. Petersburg on July 7th, 1796. In 1816 he visited England, and in 1817 married Charlotte, eldest daughter of Frederick William III. of Prussia. In 1825 he succeeded his eldest brother, Alexander I., passing over his elder brother Constantine. This gave rise to a slight mutiny in the army, which Nicholas quelled, and then began a reign of despotism and conquest. Provinces and countries were annexed and ravaged—notably Persia (1828), Poland (1831), and Hungary (1848-9)—and he kept encroaching on Persia and Turkey till it seemed as though Constantinople was in his grasp. France and Great Britain, however, forced him to withdraw his army from the Danubian provinces and invaded the Crimea in 1854. The crushing defeats which he then received broke his spirit, and he died on March 2nd, 1855, and was succeeded by Alexander II.

Nicholas II., Tsar of Russia, was born at St. Petersburg on May 18th, 1868, the son of Alexander III., whom he succeeded in 1894. On November

14th, 1894, he married the Princess Alix of Hesse, (Alexandra Feodorovna). The Coronation festivities at Moscow in 1896 were marred by an accident in which many spectators were killed. In 1898 he startled the world by issuing a Rescript inviting all the Great Powers to confer on the question of Peace. This Conference took place at The Hague in 1899. The Russo-Japanese War broke out in 1904, and, in spite of the Tsar's relations to The Hague Conference, did not terminate until Japan had shown her superiority both by land and sea. During the political ferment that the war had caused, a large body of operatives on strike, headed by Father Gapon, marched to the Winter Palace in January, 1905, to present a petition to the Tsar, but were



NICHOLAS II.

fired on by the troops and hundreds were killed and wounded. Later in the year, however, Nicholas assured a deputation (June 19) that he would summon a Duma or National Assembly to consider grievances and other public questions. The Tsar's conciliatory attitude was gratefully acknowledged, and the Duma met in January, 1906, only to be dissolved six months later.

Nichols, JOHN, printer and antiquary, was born in London on February 2nd, 1745. Originally intended for the Navy, he was apprenticed to William Bowyer, a learned printer and graduate of Cambridge, who took him into partnership in 1766. Bowyer died in 1777, leaving Nichols the residue of his personal estate. In 1778 Nichols joined David Henry in the management of *The Gentleman's Magazine*, and from 1792 was solely responsible for

it until his death. An intimate friend of Dr. Johnson, they frequently met at the Essex Head Club, and Johnson often acknowledged Nichols's assistance. Writing to John Hoole, August 13th, 1784, he sent Nichols this gracious message: "I shall be glad of his correspondence, when his business allows him a little remission; though to wish him less business, that I may have more pleasure, would be too selfish." Nichols published a biography of Bowyer (who was a short man) in 1782, of which Walpole said: "I scarce ever saw a book so correct. . . . I wish it deserved the pains he has bestowed on it, . . . and that he would not dub so many men great. I have known several of his heroes who were very little men." Nichols was elected Common Councilman for the ward of Farringdon Without, London, in 1781, but lost his seat in 1786. Being re-elected he was appointed deputy of the ward by John Wilkes, its alderman. Of the many works he edited, or wrote, and published, he considered *The History of Leicester*, which appeared in 1795-1815, the most important. He retired to his native village of Islington in 1803, but in the following year was elected Master of the Stationers' Company, when "he attained the summit of his ambition." He was twice married, and after an honourable career died suddenly in London on November 26th, 1826. JOHN BOWYER NICHOLS, his eldest son, was born in Red Lion Passage, Fleet Street, London, on July 15th, 1779. Educated at St. Paul's School, he entered his father's printing office in 1796. Becoming sole proprietor of *The Gentleman's Magazine* in 1833, he transferred it to John Henry Parker for a nominal consideration in 1856. Besides being the author of several works, he saw a large number of county histories through the press. Master of the Stationers' Company in 1850, and held in high esteem as a man and an antiquary, he died at Ealing on October 19th, 1863. His eldest son, JOHN GOUGH NICHOLS, was also born in Red Lion Passage, on May 22nd, 1806. He was sent to a school at Islington, where Benjamin Disraeli was a scholar, and his education was completed at the Merchant Taylors' School, which he left in 1824 for his father's counting-house. From an early age he kept antiquarian journals and assisted his grandfather in the preparation of his work *The Progresses of James I.*, which he completed two years after John Nichols's death. Ill-health compelled him to retire from the editorship of *The Gentleman's Magazine*, but he still pursued his favourite subject, and a long list of works stands to his credit. He died at Holmwood on November 14th, 1873, the third, and not the least, of a family whose hereditary interest in the same line of study is remarkable.

Nicholson, JOHN, brigadier-general, was born in Dublin on December 11th, 1821, and educated privately and at Dungannon College. In 1839 he entered the service of the East India Company, and took part in the defence of Ghazni (1841) and was afterwards conveyed a prisoner to Kabul. On the rescue of the captives Nicholson returned to India, and was present at the battle of Ferozeshah (1845). After the conclusion of the Sutlej campaign he was

appointed assistant to the Resident at Lahore (1846), was engaged in the second Sikh war, and later (1849) was Deputy-Commissioner of the Punjab. In the Mutiny (1857) he suggested and helped to organise the famous movable column, and dealt with great success with the suspected Sepoy regiments. At Trimmu Ghaut and Najafgarh he annihilated rebel forces, and led the first column, as brigadier-general, at the siege of Delhi, where he was mortally wounded and died on September 23rd, 1857.

Nicias, a distinguished Athenian war minister and general. He was a supporter of Pericles and afterwards the opponent of Cleon and Alcibiades. He succeeded in patching up a peace in the Peloponnesian war (421 B.C.), but hostilities were soon resumed. Nicias opposed the expedition to Sicily in 415, but when it was agreed upon he accepted the command with Alcibiades and Zannachus. On the death of Alcibiades, Nicias became practically sole general, and in 414 was on the point of capturing Syracuse when the Spartan Gylippus came to the rescue, with the result that, though Demosthenes brought reinforcements, the Athenians were utterly defeated. Nicias's blunders drove them to surrender, whereupon Nicias and Demosthenes were put to death by the Syracusans (414).

Nickel, a white metal, with symbol Ni. and atomic weight 58, discovered by Axel Fredrik Cronstedt, the Swedish chemist, in 1751. The ores are widely distributed, and are found in compound with other minerals, important varieties being the kupfernickel (arsenide of nickel) of Norway and elsewhere, and the garnierite (hydrosilicate of magnesia and nickel) of New Caledonia and certain States of the American Union. Its malleability, tenacity, and ductility can be enhanced by the addition of a small percentage of magnesium, in which condition it has become largely employed in industrial processes. With copper and zinc it makes alloys of German silver and "white metal," and in this respect is extensively used in the coinage of the cheap moneys of several Continental States. It is of great service, too, as a plating of other metals, giving them an attractive appearance and preventing rust. It was discovered in 1888 that the addition of a small percentage of nickel to steel greatly increases its hardness and tenacity; and this fact was at once taken advantage of for the making of ship's armour. The plates offer, roughly speaking, about 20 per cent. greater protection than the best simple steel plates of the same thickness, and they have since been very generally adopted as the materials for the thinner armour, and for the protective decks of men-of-war. They are further hardened and toughened by various processes, among which those of Harvey and Treasider are the most successful.

Nicobar Islands, a group of nineteen islands (seven uninhabited) in the Bay of Bengal, 91 miles N.W. of Sumatra. They cover an area of 635 square miles. They are divided into three sections—the Southern (chief isle, Great Nicobar), Central (chief isles, Camorta and Nancowry), and Northern (chief

isles, Car Nicobar). The people belong to the Malay race. The dense forests yield teak, plantains, and coconuts, but the climate is detrimental to Europeans. The islands were occupied by Great Britain to put an end to the piracy in which the natives indulged in the local seas. They are administered from Port Blair in the Andamans, south of which they lie. Pop. (1901), 6,310.

Nicol, Erskine, genre painter, was born at Leith, Scotland, on July 3rd, 1825. After several years spent in business he studied art at the Trustees' Academy, Edinburgh, under Sir William Allan and Thomas Duncan. He lived in Edinburgh for some years, making a bare living by portrait painting and teaching drawing. A visit to Dublin in 1849, where he lived three or four years, decided his choice of subject, and in 1859 he painted his well-known picture of "Donnybrook Fair." In 1862 he settled in London, and in 1866 was elected an Associate of the Royal Academy; he was also a member of the Royal Scottish Academy. During these four years he painted many pictures, of which "Renewal of the Lease Refused," 1863, "Waiting for the Train," 1864, and "A Deputation," 1865, may be mentioned. His other pictures include "Outward Bound," "Homeward Bound," "The Trio," "Blarney," "A Country Booking-Office," 1867, "A Disputed Boundary," 1869, "The Sabbath Day," 1875, and "Interviewing their Member," 1879. In 1885 he retired from the Academy through ill-health, and died on March 8th, 1904. Excellent in drawing and colour and admirably composed, his pictures of Irish humorous incident are inimitable.

Nicolai, CHRISTOPH FRIEDRICH, bookseller and author, was born in Berlin on March 18th, 1733. He was still a young man when he acquired (1756) some reputation for his criticisms on German literature. He assisted, in co-operation with Moses Mendelssohn and Lessing, to reform the national taste. The first volume of his greatest critical work, *Allgemeine deutsche Bibliothek*, appeared in 1765, and was succeeded by 105 more volumes. He underrated Goethe and attacked Kant, and lost influence owing to his unsympathetic attitude to the new spirit that had begun to stir letters in the leading countries of Europe. He died in Berlin on January 8th, 1811.

Nicolai, OTTO, composer, was born on June 9th, 1810, at Königsberg, East Prussia. He ran away from an unhappy home at the age of sixteen, finding a friend in Justizrath Adler, of Stargard, who sent him to study music in Berlin. Being appointed organist of the chapel of the Prussian Embassy in Rome, he pursued his musical education there. In 1837 he was made Capellmeister in Vienna, but returned to Rome the following year, and there composed several operas. He became first Capellmeister of the Court Opera in Vienna in 1841, when he established Philharmonic Concerts for the special purpose of performing Beethoven's Symphonies. In 1847 he was made Court Capellmeister in Berlin. His best-known opera, *The Merry Wives of Windsor*, was produced there on March 9th, 1849,

but he did not long enjoy his greatest success, as he died on the following 11th May.

Nicolas, ST., Bishop of Myra, in Lycia, flourished towards the end of the fourth Christian century. He was famed for his charity. He became the patron saint of Russia and of the Dominican Order, and also of virgins and sailors. In a general sense he is the patron saint of children (more particularly of boys, as St. Catherine was of girls), and as Santa Claus—a corruption of *Sankt Nikolaus*—is the object, in all Christian countries, of eager juvenile regard every Christmas Eve. But his own day is December 6, and originally—in Germany at least—it was the evening of December 5th and not of December 24th that was chosen for the distribution of gifts. "Clerks of St. Nicholas" became a synonym for robbers, not because the saint had any sympathy with crime, but either because (according to one tradition) he induced a company of thieves to restore their booty, or because his aid was so often invoked against rogues that they were ironically dubbed his "clerks."

Nicolas, SIR NICHOLAS HARRIS, antiquary, was born at Dartmouth, Cornwall, England, on March 10th, 1799. He became a lieutenant in the Navy at the early age of sixteen, but being unable, after the peace, to obtain employment in the service, he was called to the Bar in 1825, but limited his practice to peerage claims before the House of Lords. Turning his attention to genealogy and other branches of archaeological research, he became F.S.A. in 1824, but withdrew from the society four years later on the ground that it refused to put its house in order. To his caustic criticism of the Record Commission was due the Select Committee of inquiry (1836), and at a later date (1846) he demanded a reform in the management of the British Museum library. He died at Cape Cure, a suburb of Boulogne, France, on August 3rd, 1848. In 1831 he was created Knight of the Guelphs of Hanover, and in 1832 he became Chancellor of the Order of St. Michael and St. George, and, in 1840, was promoted to the status of Grand Cross. He is chiefly remembered for numerous learned works, among which may be noted his edition of Lord Nelson's *Letters and Despatches* (1844-6), his uncompleted *History of the Royal Navy* (1847), and his *History of the Orders of Knighthood of the British Empire and of the Guelphs of Hanover* (1841-2). He was also a distinguished inventor, and made several improvements in telegraphy and in marine signalling.

Nicoll, ROBERT, poet, was born on January 7th, 1814, at Auchtermaven, Perthshire, Scotland. Owing to the poverty of his parents, he received but an imperfect education, though he read all the books he could find. At the age of sixteen he was apprenticed to a grocer and wine merchant at Perth, but ill-health caused him to give up business. He proceeded to Edinburgh, where he occasionally contributed to *Johnstone's* (afterwards *Tait's*) *Magazine*, in which appeared his first tale, "Il Zingaro." He next opened a circulating library in Dundee, which was unsuccessful. In 1835 his poems were published

by Tait of Edinburgh, and had more of a commercial than of a literary success. In 1836 he became editor of the *Leeds Times* at a salary of £100 a year. In consequence of his arduous and successful exertions on behalf of Sir William Molesworth in the General Election of 1837, his health completely broke down. He returned to Scotland and died at Laverock Bank, near Edinburgh, on December 7th, 1837. Though certainly not in the first rank of poets, Nicoll still takes a high place. His poems in the Scottish dialect are much superior to those in literary English.

Nicol's Prism, an instrument for polarising light, or for analysing it when polarised. It is made by cutting a piece of Iceland spar in a particular diagonal plane and after polishing the cut surfaces sticking the two halves together again by means of Canada balsam. The Canada balsam has such an index of refraction that the ordinary ray is totally reflected, and only the extraordinary ray passes through the prism. The prism was first described in 1828 by its inventor, William Nicol of Edinburgh (d. 1851), after whom it was named, the name being often also applied to the improved varieties as well.

Nicosia, or LEVCOSSIA, capital of Cyprus, situated towards the centre of the northern half of the island, which lies in the easternmost basin of the Mediterranean. The chief buildings are the fine cathedral of St. Sophia, and the church of St. Catherine, a beautiful example of Southern Gothic (both now used as mosques), the church of St. Nicholas of the English (now a granary), built for the Knights of St. Thomas of Acre, the residence of the High Commissioner, and the Cyprus Museum of Archaeology. The labours of antiquaries have yielded important discoveries, especially south-west of the town, where, a mile away, has been explored a Bronze-Age cemetery. Of the Venetian period the only remains are the walls and a gateway. The industries comprise tanning and silk and cotton weaving. Nicosia is a Greek archbishopric. Pop. (1901), 14,752.

Nicot, JEAN, Lord of Villemain, diplomatist, was born, the son of a notary, at Nîmes, France, in 1530, and, after studying in Paris, became attached to the court of Henry II. When he was French ambassador at Lisbon in 1560, he sent to Catherine de' Medici, queen of Francis II., a species of the tobacco plant. According to another account, however, he brought it back with him from Bordeaux, where he had obtained it from a Flemish teacher. In any case, as its introducer the plant was named after him *Nicotiana*. Nicot published *Historia Francorum* in 1566, and was the compiler of the first French dictionary, *Trésor de la langue Française*, although it was not issued till six years after his death, which occurred in Paris on May 5th, 1606.

Nicotine ($C_{10}H_{11}N_2$), a poisonous alkaloidal substance occurring in the leaves of the tobacco plant, from which source it may be obtained. It is a colourless oily liquid, soluble in most organic solvents and in water, which it readily absorbs

from the atmosphere. It turns brown on exposure to the air, and decomposes if boiled. It acts on polarised light, being levorotatory. It possesses a burning taste, and is very poisonous. The presence of nicotine in tobacco smoke has been asserted and denied by different chemists. Its constitution is given by the formula C_6H_4N . $C_8H_{10}N$, i.e., it is hexahydro-dipyridyl.

Niebuhr, BARTHOLOMÆ GEORGE, historian of ancient Rome and classical scholar, was born at Copenhagen on August 27th, 1776, while his father, KARSTEN NIEBUHR (1733-1815), a distinguished German engineer and traveller, was in the Danish service; but in his second year he was taken to Ditmarsh, in Holstein. After acquiring some knowledge of commerce at Hamburg (1793), and studying law at Kiel (1794-6), he went, in 1798, to Edinburgh to study natural science for a year and a half, and then, after travelling in England for half a year, he obtained high financial appointments in Copenhagen. In 1806 he entered the Prussian Service, and took an active part, under Stein, in the re-establishment of Prussian affairs. In 1810 he lectured on Roman history in the new university of Berlin, and in the two succeeding years published the first two volumes of his Roman history. These he recast from 1827 to 1830. The third volume he left unfinished. In 1816 he became Prussian ambassador at the Papal court, and from 1823 he settled at Bonn, where he died on January 2nd, 1831. The most important of his many contributions to classical scholarship are his discovery in Verona of the *Institutions of Gaius* (1816), and his edition of unedited fragments of the works of Cicero and of Livy (1820).

Niederwald, the south-western extremity of the Taunus mountain range in Hesse Nassau, Germany, on the right bank of the Rhine, opposite Bingen. Its highest point is 1150 feet above the sea, or 900 feet above the level of the river. Near the summit was unveiled, on September 24th, 1883, the national monument erected to commemorate the victories of the Franco-German campaign of 1870-1. On an immense pedestal adorned with reliefs and allegorical figures stands the bronze statue of Germania. The work was designed by Johannes Schilling of Dresden. The monument is usually reached by mountain railway from Rüdesheim, noted for its Rhine wine.

Niel, ADOLPHE, marshal, was born at Muret, department of Haute-Garonne, France, on October 4th, 1802. He became lieutenant of Engineers in 1827 and captain in 1833. He was made chief of battalion in recognition of his services in the taking of Constantine, in Algeria. During the siege of Rome he served as chief of staff under General Vaillant, and after the fall of the city, in 1849, he was charged to restore the keys to Pius IX., then a refugee at Gaeta. On July 13th, 1849, he was promoted brigadier-general, and on his return to Paris assumed the direction of Engineers at the Ministry of War. In 1851 he became a member of the Committee of Fortification and in 1852 of the Council of State. As general of division he

commanded the Engineers in the expedition to the Baltic (1854) and directed the attack on Bomarsund. In the same year he proceeded to the Crimea, where he greatly distinguished himself, and was made Grand Cross of the Legion of Honour. In the Italian war of 1859 he commanded the 4th Army Corps, and shared with Macmahon the victories at Magenta and Solferino. Next day (June 25th) the Emperor created him marshal. In 1867 he succeeded Randon as Minister of War, and died in Paris on August 13th, 1869. His fame now chiefly survives in the beautiful yellow rose which was named after him.

Niello, a kind of damascening invented by the Romans and revived in Italy in the 15th century. The process has a large vogue in Russia, where the best examples are now produced. A design is engraved or chased in metal or other material and filled in with an alloy of silver, copper, lead, sulphur, and borax. One of the greatest practitioners, Finiguerra of Florence, used to take proofs of his incised designs before they were filled in, a practice which is said to have given the first hint of the art of line-engraving. The word comes from the Italian *niello*, which is from *nigellus*, "dark," a diminutive of *niger*, "black."

Niepce (pron. *Nir-eppe*), JOSEPH NICÉPHERE, physician, and the inventor of photography, was born at Chalon-sur-Saône, France, on March 7th, 1765. He entered the army in 1792 and attained the rank of lieutenant, but was forced to resign owing to bad health and poor sight. In 1801 he devoted himself to scientific research. In 1811 he perfected the manufacture of pastel, and shortly afterwards became interested in lithography, then a recent invention, but being unable to obtain the stones, tried the use of tin. In 1813 he conceived the idea of making the drawing by the aid of light. In 1822 he obtained on the sheets of tin and with the aid of a bituminous varnish, successful reproductions of engravings. In 1824 he completed his invention and was able to reproduce images on the sheets of prepared tin, which he replaced later by copper and finally by silver plate. In 1829 he entered into an agreement with Daguerre "to co-operate in the perfecting of the discovery invented by M. Niepce and improved by M. Daguerre." The agreement, which states that Niepce brought his invention and Daguerre "a new combination of the dark room," leaves no doubt as to their titles to the discovery of photography. He died unknown and poor at Gras, near Chalon-sur-Saône, on July 3rd, 1833.

Nietzsche, FRIEDRICH WILHELM, German philosopher, was born at Rükken, Saxony, on October 15th, 1844. He studied at Bonn and Leipzig, where his treatises on *Theognis* and the *Origin of Tragedy* won him distinction. In 1869, while still an undergraduate, he was appointed assistant-professor of Classical Philology in the University of Basel, and soon became full professor, but retired in 1876 on account of ill-health. From 1878 he began, in a long series of philosophical works, an attack on religion and all

moral law, which he denounced as a remnant of Christian superstition. His writings must be considered in relation to his life and his morbidly emotional and nervous temperament. In spite of their want of method, and what some might deem chaos, his writings are nevertheless conspicuous for their vigour and epigrammatic brilliance. His attitude was that of revolt against whatever is established, and his "overman" is the incarnation of lawlessness and brute force. He was much influenced by Schopenhauer and Naturalism. After spending ten years at various health resorts, he became hopelessly insane towards the end of 1888, and he died on August 26th, 1900. His writings include *The Birth of Tragedy from the Spirit of Music* (1872); *Thus spake Zarathustra* (1883-4); *The Genealogy of Morals* (1887); *The Case of Wagner* (1888); and *The Twilight of the Idols* (1888).

Nièvre, a central department of France, bounded on the N. by Yonne, on the N.E. by Côte d'Or, on the S.E. by Saône-et-Loire, on the S. by Allier, on the W. by Cher, and on the N.W. by Loiret. It was formed out of the old province of Nivernais and part of the Orléanais, and has an area of 2,659 square miles. It is hilly in the east, where the highest point is Mont Prénecley (2,790 feet), a peak of the beech-and-chestnut-clad Morvan. The Loire cuts across the south-west, and other rivers are the Nièvre, Yonne, and Cure. The live stock is very considerable, and the chief crops are wheat, oats, barley, potatoes, and beet. Grapes are cultivated for Paris and a large quantity of wine is made. The leading industries are coal and iron, and the manufactures include paper, pottery, glass, tiles, chemicals, textiles, leather, besides breweries and oil-works. The abundant forests furnish charcoal, firewood, and timber. The principal mineral springs are those of Pongues (chalybeate) and St. Honoré (sulphurous). Nevers is the capital. Pop. (1901), 319,506.

Niger, next to the Nile and Congo, the largest and most important river in Africa. It rises in 9° 5' N. and 10° 46' W., in the Mandingo country. Its course is mainly north-easterly as far as Timbuktu, when it strikes eastwards and then bends to the south-east as far as Lokoja, where it flows in a southerly direction and enters the Bight of Benin by several mouths, after a total run from its source to the Nun, the principal outlet, of 2,600 miles. It bears various names in various stretches. The young stream is called the Tembi, then it becomes the Joliba, past Timbuktu it is known as Mayo Balleo, and lower down it is the Isa Kwara, or Quorra. The Delta begins about 100 miles from the sea. There are innumerable tributaries, but the only affluent of first-rate importance is the Benue, which enters it on the left about 250 miles from the Atlantic. The principal places of interest on its banks

are Bamaku (where it first becomes navigable), Segu, Sansanding, Kabara (the port of Timbuktu), Gogo, Say (Heinrich Barth's southernmost point), Bussa (where Mungo Park perished in 1806), Rabba, Lokoja, and Asaba. The total area drained by the Niger is variously estimated at from 584,000 to 1,000,000 square miles. Politically, France controls the upper and middle sections of the river, and Great Britain the lower stretch as far as Ilo.

Nigeria, a British Protectorate in West Central Africa, bounded on the N. by the French Military Territories (roughly 14° N.), including the shore of Lake Tchad south of Barna, on the E. and S.E. by Kamerun (German), on the S. by the Gulf of Guinea, and on the W. by Dahomey (French). It covers an area of 310,000 square miles. It comprises Northern Nigeria (258,000 square miles, divided among Sokoto, Kano, Borgu, Ilorin, Bornu, Yola, Nupe and ten other provinces), Southern Nigeria, formerly called the Oil Rivers Protectorate (51,500 sq. m.), and Lagos. The country rises very gradually from the pestilential coast region to the hilly interior where, in the province of Bauchi, an elevation of 6,000 feet is reached. The principal rivers are the Niger, with its many affluents and deltaic mouths, and the Benue, the chief tributary of the Niger. The flora is particularly valuable, and embraces the oil-palm, banana, yam, rubber, shea-butter (*Bassia Parkii*), locust-tree, gambier, and tamarind, while among crops raised are millet, maize, wheat, cassava, rice, peas and beans, sweet potatoes, and ground nuts. Cotton and indigo are also cultivated. The coast natives are mostly



MAP OF BRITISH NIGERIA.

negroes, some of whom were until recently given to cannibalism and fetish or "ju-ju" rites, while in the interior are met with blends in various degrees of Arab and negro, the most important race being the Hausas, styled, for their enterprise and industry, the "Parsees of West Africa." Trade is extensively carried on in many of the vegetable products named, and, besides, in ivory, hides, mahogany, capscums, kola-nuts and plants of medicinal consequence. Salt and soda deposits are found in Bornu, tin occurs in Bauchi, and silver in Muri and Orufu. The principal towns are Wurnu, the capital (pop. 6,000), Kano (the most important emporium in Northern Nigeria), Yakoba (50,000), Yola, Bida, Ilorin, Asaba, Onitsha, Lokoja, Egga, Kabbia, Bussa, Loko, and Ibi. The trading posts on the coast are, on the east, Old Calabar, or Duke Town (40,000), Opobo, Bonny, New Calabar, and Brass, and on the west, Warri, Buruti, Sapele, and Benin. Although commerce had long been carried on between Liverpool and other British ports and the coast, it was not till the last quarter of the 19th century that political claims were asserted. In 1879 the United African Company (enlarged in 1882 to the National African Company), which had been formed to develop the country, secured in 1884 treaties with several native chiefs, besides buying out French interests in the lower Niger, where Great Britain was now sole and paramount. In 1886 the Company received a charter as the Royal Niger Company, with power to administer the country from the Guinea coast to Sahara. The portion of the coast that had not been controlled by the Company became (1893) the Niger Coast Protectorate and passed under consular jurisdiction. By 1900 the interests undertaken by the Company had grown too vast and complicated, and its administration (having regard to foreign relations) too responsible to be longer entrusted to a private concern, and its rights were transferred in that year (January 1) to the British Crown. The administrative headquarters of Northern Nigeria are at Zungeru, those of Southern Nigeria at Calabar. In 1906 the administration of Southern Nigeria was placed under that of Lagos, the name of this colony being altered to that of the Colony of Southern Nigeria. Pop. (1901), 25,000,000.

Night-Heron, a bird of the cosmopolitan genus *Nycticorax*, with nine species closely allied to the Heron, which it resembles in habit. The Common Night-Heron (*N. griseus*), which breeds in the south of Europe, has of late years visited Great Britain. It is about two feet long, with bluish-grey plumage; a black patch runs from the crown to the middle of the back.

Nightingale, a bird of the Passerine genus *Daulias* of the Thrush family, with two species from Europe, Western Asia, and North Africa. The Common Nightingale (*D. luscinia*) is nearly seven inches long; the plumage is alike in both sexes—rich chestnut-brown above, with a rufous tinge on the tail, greyish-white beneath, deepening in hue on the breast. These birds visit England, arriving about the middle of April, the males coming first

by some days, and numbers are then taken by the bird-catchers. Birds captured thus do better in confinement than those trapped after pairing. Nightingales are locally distributed during their stay, chiefly in the south and east, a few ranging to the west, and to Glamorganshire and Brecknockshire, but they do not visit Scotland or Ireland. They frequent groves, small shady copses, woods, quiet gardens, and thick hedgerows, and feed on worms, insects, and insect larvæ. The nest is made in a hollow in the ground, or in a low fork in a thick bush, and the eggs—olive-green in colour—are generally five in number. The song of the nightingale, which has been famous from the earliest times, and celebrated by poets of almost



NIGHTINGALE.

every land, is the love-song of the male and ceases when incubation is over. The Thrush-Nightingale (*D. philomela*), a Continental species, is slightly larger, and has the breast spotted.

Nightingale, FLORENCE, philanthropist, was born at Florence (hence her Christian name) on May 15th, 1820. Turning her attention early in life to existing means and institutions for the relief of human suffering, she not only visited the chief hospitals in Europe, but was also trained as a nurse by the Protestant Sisters of Mercy at Kaiserswerth. On her return to London she reformed the Governesses' Sanatorium in Harley Street. When the Crimean War broke out (1854), her offer to organise and superintend the nursing staff and department was accepted, and her devotion and example alleviated much suffering and saved innumerable lives. After the war she was presented with a testimonial of £50,000, which she expended on the founding of the Nightingale Home for the Training of Nurses. In later years she was

frequently invited to advise on the subject of the sanitary conditions of the army and military hospitals, and matters of general public health. In 1858 she published her *Notes on Nursing*, and next year *Notes on Hospitals*. In 1863 the report



FLORENCE NIGHTINGALE.

of the Commission on the sanitary state of the army in India contained valuable comments from her pen. Her *Notes on Lying-in Institutions* appeared in 1871, and in 1873, in *Life or Death in India*, she returned to a subject that had already deeply occupied her thoughts. She has the Order of the Royal Red Cross, and is a Lady of Grace of the Order of the Hospital of St. John of Jerusalem.

Nightshade, the popular name of the English species of *Solanum*, the Woody Nightshade, and of the allied *Atropa belladonna*, the Deadly Nightshade. This latter is an erect, stout-branched, herbaceous plant, with large, ovate leaves, drooping, bell-shaped, luridly brownish-purple flowers, and black cherry-like fruits with a persistent green calyx. Its deadly narcotic properties are chiefly in the roots and leaves. [ATROPINE.]

Nihilism, in Russia, organised opposition to the established order of society and government. The term, of course, also embraces the principles and methods adopted by various secret revolutionary societies in Russia, some of which, however, have left the purely destructive position and become democratic and socialistic rather than merely anarchical. The more violent Nihilists or "terrorists" aim at upsetting the present system by mysterious and appalling outrages, such as the assassination of the Czar Alexander II. (1881). The term originally implied only negation of the

principles generally accepted by society in Russia. In metaphysics, scepticism carried as far as the assertion that nothing really exists, has been called Nihilism.

Niigata, a seaport on the west coast of the island of Hondo, Japan, at the mouth of the Shinano, 160 miles N.N.W. of Tokyo. The town is well laid out, many of the streets being bordered with canals. The chief buildings are the college, hospital, arsenal, and barracks. The manufactures include woollens, cottons, and lacquer. The exports are mostly to home ports, and consist largely of petroleum (from wells in the vicinity of the town), tea, silk, and silkworms' eggs. Although opened to foreign trade in 1859, the harbour is defective (mainly in consequence of a bar), and commerce on the grand scale scarcely exists. Niigata is the capital of the province of Echigo, which is noted for its apples and melons. Pop. (1900), 54,750.

Nijni-Novgorod, capital of the government of the same name, central Russia, at the junction of the Oka with the Volga. It is divided into an upper town situated on hilly ground, where the 14th-century Kremlin or citadel stands, and a lower town laid out along the rivers' banks. In the cathedral of the monastery of the Annunciation is a portrait of the Virgin, traditionally believed to have been painted in 993. The town is famous for its fair, which lasts from the middle of July to September, attracts traders from all parts of Europe and Asia, and is still, though showing symptoms of decline, the greatest in the world, the business done averaging £20,000,000. The fair (for which exceptional facilities in the way of warehouses and booths have been provided) was transferred hither from Makariev in 1817, and may be said to date the prosperity of the town. Pop., 95,124, increased six or seven times during the fair. The government of NIJNI-NOVGOROD has an area of 19,797 square miles, is watered mainly by the Volga, Oka, and Vetluga, and is for the most part a level tract. Agriculture and live stock are the leading industries, the principal crops being wheat, oats, rye, flax, and hemp. The forests are considerable, and the minerals include iron, alabaster, limestone, sand, and phosphorites. The manufactures comprise iron goods, machinery, pottery, and leather, besides shipbuilding, saw mills, and distilleries. Pop., 1,600,804.

Nikolaieff, seaport, in the government of Kherson, Russia, at the head of the estuary of the Bug, here joined by the Ingul, about 40 miles from the Black Sea. It is the chief naval station of the Black Sea, and strongly fortified. Among the principal buildings are the naval school, observatory, and arsenal. The manufactures include flour, tobacco, soap, vinegar, and agricultural implements, and there are also iron works, engineering shops, and sawmills. Though the imports are small, the export trade, especially of grain, is very large. The port is kept open throughout the winter by an ice-breaker. Pop., 92,060.

Nile, the greatest and most famous river of Africa, its course extending, from south to north,

over more than half the entire length of the continent. Its headwater is the Kagera, or Alexandra Nile, a stream rising near the north-eastern extremity of Lake Tanganyika and flowing into Victoria Nyanza (3,900 feet above the sea). After leaving this lake as the Somerset or Victoria Nile, it pours over the Ripon Falls, passes through the two small lakes Gita and Kioja, descends the Murchison Falls and enters the north-eastern end of Albert Nyanza. This lake is fed by the Semliki

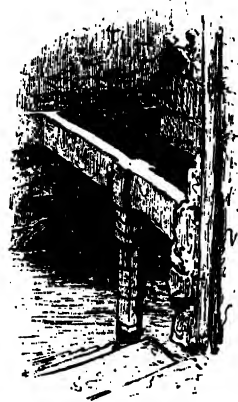


SKETCH MAP OF THE NILE.

is joined from the south-east by the Bahr el Azrak, or Blue Nile, which rises in Lake Tzana, in Abyssinia. Above Berber the last tributary, the Atbara, or Black Nile, also from Abyssinia, falls into the main river. Between Khartoum and Assouan navigation is perilous if not impracticable, owing to the cataracts, six in number, which obstruct the stream at various points. After it leaves Assouan the river pursues a northerly direction, past Thebes, Siut, Memphis, and Cairo, to the great Delta through which it discharges itself into the Mediterranean, the chief channels issuing at Rosetta (in the west) and Damietta (in the east). The entire length of the Nile is estimated at from 3,500 to 4,000 miles.

From Berber it flows through a valley which is almost rainless, but much of which is fertilised by the yearly inundations of the river. The river begins to rise at Gondokoro in April, at Khartoum in May, and is at its height in September. In the Delta and at Zifta, Siut, and Assouan irrigation works have been constructed which have had a marked effect in enhancing the fertility of the valley of "the river of Egypt." The White, Blue, and Black sections derive their names from the colour of the sediment which each bears. It is the black sediment brought down by the Atbara that enriches the Delta so much. The sudd, a kind of floating peat, or accumulated vegetable *débris*, which clogs the river, especially in the Eastern Soudan, and seriously impedes navigation, has been removed in many places with notable advantage.

Nilometer, a measure or gauge of the rise of the water of the Nile. In ancient times there would seem to have been several of such river gauges stationed at Memphis and other parts of the stream, but the best known is that in the island of Roda, off Old Cairo. This consisted of a marble pillar erected in a well which communicated, by means of a canal, with the river. The pillar was divided into cubits (≈ 21.386 inches each), and according to the height reached the Nile was good, bad, or indifferent. A Nile of 18 cubits was regarded as a poor flood, of 20 as good, of 22 as full, and of 24 or upwards as destructive, so that both extremes foreboded disaster. The Nilometer at Roda was built about 850.



NILOMETER AT RODA.

Nilsson, CHRISTINE, singer, was born at Vederslöv, Småland, Sweden, on August 23rd, 1843. Her father was a peasant farmer, whose family his little girl, by her beautiful voice and musical gifts, was able to help by singing and playing the violin at village festivals. The governor of Ljunby sent her, at the age of 14, first to Adelaide Valerius (afterwards Baroness Leuhusen), and then to Professor Franz Berwald at Stockholm, under both of whom she made a great advance. At a later date she went to Paris to study under Wartel, and made her *début* at the Théâtre Lyrique in 1864 as Violetta in *La Traviata*, her performance evoking much enthusiasm. She made her first appearance in London at Her Majesty's Theatre in 1867, and from that year onwards her success in all countries was complete, not only in opera, but in oratorio and concert also.

During several seasons she was *prima donna* in the Royal Italian Opera at Drury Lane or Covent Garden. Her most admired rôles were Marguerite, Elsa, and Mignon. In 1872 she married M. Auguste Rouzard (d. 1882), and in 1887 the Comte de Miranda (d. 1902), when she retired from her profession.

Nimbus, in art, the halo or circle of rays round the head of a deity, angel, saint, or emperor. The pattern came to be varied; for instance, the nimbus of Christ contained a cross, of God a double triangle, while that of a living emperor was square. The term is often confused with aureola, the rays of which surround the whole figure, and with glory, which is properly a combination of aureola and nimbus.

Nimeguen, a town of Gelderland, Holland, on the Waal, 9 miles S. of Arnhem. It consists largely of crooked narrow streets running up hilly ground, but contains several handsome squares and places and a fine promenade, the Kalverbosch, laid out on the site of the old fortifications. It was the Roman *Noviomagus*, a form which is still preserved in its name. The chief buildings are the venerable church of St. Stephen (1272), the Renaissance town-hall and the Belvedere tower erected on a height by the Duke of Alva. The manufactures include tobacco, beer, eau de Cologne and metal ware. The treaties of peace between France and Holland, between France and Spain, and between France and Austria were agreed upon at the great congress held at Nimeguen in August, 1678. Pop. (1900), 42,756.

Nîmes, or NISMES (the Roman *Nemausus*), capital of the department of Gard, France, 62 miles N.W. of Marseilles. The chief buildings are the cathedral of St. Castor, the modern Romanesque church of St. Paul, with frescoes by Paul Flandrin, the Gothic St. Baudile's, the Palais de Justice, the Hôtel Dieu, the old citadel (now a prison), the picture gallery, public library, the natural history museum, and the prefecture. But its Roman remains are the glory of Nîmes. These include the Amphitheatre, elliptical in design, 437 feet long, 332 feet broad, and 70 feet high; the Maison Carrée, a temple converted into a museum; the temple of Diana; and the Tour Magne, or Grand Tower, supposed to have been a mausoleum, which occupies the finest site in the town. A few miles outside of Nîmes, to the north-east, is the Pont du Gard, 180 feet high, the most magnificent aqueduct the Romans ever constructed, consisting of three rows of arches. It conveyed the water supply of the town. At the period when all these buildings were perfect, Nîmes must have been one of the most splendid Roman towns in Gaul. During the 5th, 6th, and 7th centuries it was pillaged by Vandals, Visigoths, and Saracens. Later it passed to the counts of Toulouse, and was restored to France in 1259. The inhabitants became strongly Protestant, and, after the revocation of the Edict of Nantes (1685), many of them engaged in reprisals and joined the Camisards. The manufactures include silk and cotton goods, carpets, shawls, leather, wine,

and brandy. Jacques Saurin, Jean Nicot, François Guizot, and Alphonse and Ernest Daudet were natives. Pop. (1901), 72,479.

Nineveh, or NINUS, the capital of the Assyrian Empire, one of the most ancient cities of the world, was situated on the left bank of the Tigris opposite Mosul. Its foundation was mythically attributed to Ninus, husband of Semiramis. In the ninth century B.C. the city was an oblong of 55 miles in circuit, surrounded by brick walls 160 feet high, on which three chariots could be driven abreast, and it must have contained about 600,000 inhabitants. It was captured and destroyed by the Mede Cyaxares with the help of the Babylonians, 606 B.C. The British Museum contains a splendid collection of antiquities and inscriptions excavated from the ruins of Nineveh by Sir Henry Layard, the result of whose labours in 1845 proved that the mounds of Konyunjik concealed the remains of the ancient Assyrian capital.

Ningpo, a treaty-port in the province of Che-Kiang, China, opposite the island of Chusan in the Eastern Sea, about 100 miles south of Shanghai. It is a walled town, six miles in circumference, situated in a fertile plain. The manufactures include silks and cottons, carpets, gold and silver ware, lacquered articles, and confectionery, and the port is a busy trading centre. Among the buildings is the elaborately decorated Temple of the Queen of Heaven. Pop. estimated at 275,000.

Ninian, SAINT, the first missionary and bishop of North Britain. Of noble parentage, studious and devout, he made a pilgrimage to Rome, where, after some years, he was consecrated a bishop. Bede, to whom we owe the few facts of his life which are thought trustworthy, tells us that on his homeward journey he met St. Martin at Tours. When he returned to Galloway he built a church of stone instead of wood, which was the British custom, the Candida Casa, or Church of Whithorn. St. Martin died in 397, and Ninian dedicated the church as a tribute to the memory of the man who had provided him with masons to build it. He successfully laboured for the conversion of the Picts south of the Grampians, but Kentigern and Columba often lamented that the people afterwards lapsed from the faith. According to the Bollandists, Ninian died in 432, "perfect in life and full of years," being buried at Whithorn. He probably founded a monastic house, as Candida Casa became a favourite school where Irish missionaries were trained. The Episcopal Cathedral at Perth is dedicated to St. Ninian, and, among several villages named after him, St. Ninians, near Stirling, has a long and interesting history. A variant of his name is found in St. Rinnan.

Niobe, in Greek mythology, daughter of Tantalus, sister to Pelops, and wife of Amphion, King of Thebes. Proud of her six sons and six daughters, she regarded Leto, or Latona, with contempt as the mother of only two children; whereupon these two, Apollo and Artemis (Diana), slew all Niobe's children with their arrows. Their bodies lay on the plain for nine days because Jupiter turned into

stone all who sought to inter them, but on the tenth day the gods themselves buried them. Niobe herself was turned into stone on Mount Sipylus in Lydia, in Asia Minor. The tradition is partly founded on a rough representation of the figure of a weeping woman presented by a dripping rock on the mountain. The fable has been a favourite subject with sculptor and painter both in ancient and modern times. There is a beautiful group (discovered at Rome in 1583) in the Uffizi Palace in Florence, ascribed by tradition to Scopas or Praxiteles.

Niobium, a metallic element of which a few compounds alone are known, the metal itself not having been obtained. The minerals in which it occurs are rare and few in number, the chief being polycrase, euxenite, and columbite. Its atomic weight is 94, and its symbol Nb.

Niort, capital of the department of Deux-Sèvres, France, on the Sèvre-Niortaise, 35 miles E. by N. of La Rochelle, picturesquely situated on two hills. It has an old castle with a remarkably fine keep. The chief buildings are the church of Notre Dame (1491-1534), the Renaissance Hôtel-de-ville (1535), the Maison de Candie, in which Madame de Maintenon was born (in 1635), the public library, and the picture gallery. The manufactures include gloves, leather, shoes, and brushes, and there is an extensive trade in claret. Pop. (1901), 20,738.

Nippon. [JAPAN.]

Nirwana. [BUDDHISM.]

Nish, or NISCH (the ancient Naissus), a town of Servia, on the Nishava, 132 miles S.E. of Belgrade, situated in the midst of a vine-growing district. It is the seat of a Greek bishop. It was the birthplace of Constantine the Great. The town has played an important part in warfare from 1375, when it was captured by the Turks, to 1878, when it was restored to Servia. Pop. (1900), 25,730.

Nishapur, a town in the province of Khorassan, Persia, 45 miles W. of Meshed. It is in a ruinous condition, but has some trade in the turquoises for which the mines in the province are noted. It is famous as the birthplace of Omar Khayyâm, the poet and astronomer, whose dilapidated tomb may still be seen to the east of the town. Pop. estimated at 15,000.

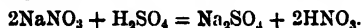
Nisi prius. This phrase originally occurred in the old writ (of which they formed the first two words) commanding the sheriff of a county to bring the jurors in a civil action to Westminster by a certain day, "unless before" (*nisi prius*) that day the justices came to the county to hold the assizes. Accordingly, trial at *nisi prius* means trial of a civil action before a judge and jury. In divorce suits a "decree *nisi*" means that the marriage shall be dissolved within a given period (in England six months) *unless* cause be shown to the contrary. No cause being shown, the decree *nisi* becomes absolute at the expiry of the term.

Nithsdale, WILLIAM MAXWELL, 5TH EARL OF, was born in 1676. He married in Paris in 1699 Winifred Herbert, youngest daughter of the first Marquis of Powis. Being a devoted Jacobite and fervent Catholic, he became suspect to the Presbyterians in the neighbourhood of his mansion of Terregles, and was deprived of the hereditary stewardship of Kirkcudbrightshire (1704). He came "out" in the abortive rising of 1715, was captured in the fight at Preston, was tried in 1716, and, despite professions of repentance, sentenced to be beheaded on Tower Hill, London. By the heroism and ingenuity of his wife he escaped from the Tower on February 23rd (the eve of his intended execution) and made his way safely to France. The House of Lords pronounced his life-rentals forfeit and his honours attainted. The Earl and Countess ultimately joined the Old Pretender in Rome, where Nithsdale died on March 20th, 1744. His wife survived him five years.

Nitre, or SALTPETRE, consists chemically of nitrate of potassium (KNO_3), and was known to the early alchemists under the names of *sal nitri* and *sal petre*. The latter name is derived from the fact that in some countries it is obtained by the lixiviation of certain felspathic rocks. It occurs as an efflorescence on the soil in many tropical regions. It is met with thus owing to the decomposition of organic nitrogenous matter under the influence of certain bacteria [NITRIFICATION], and this action is still frequently adopted for its artificial preparation. It is now very largely produced by heating potassium chloride and Chili saltpetre (sodium nitrate) in strong solutions. The nitre remains in solution and common salt is precipitated. Nitre occurs crystallised in two forms: (1) prisms of the rhombic system, and (2) rhombohedral crystals. It is very soluble in water, the solubility increasing rapidly with the temperature, 100 parts of water dissolving about 25 parts of nitre at ordinary temperatures, and 247 parts at 100° C. It is employed in the chemical laboratory as well as for pickling purposes, for the production of touch-papers (prepared by dipping paper in the solution and then drying it) and fuses, and in pyrotechny. Its chief use, however, is for the manufacture of gunpowder, of which it forms about 75 per cent. It is often employed in medicine (in which it is known also as *sal prunelle*). The sweet spirits reduce mild fever and produce perspiration; nitre balls are a popular remedy for sore throat; the breathing of the fumes of touch-paper sometimes gives relief in asthma; and in acute rheumatism nitre acts with marked effect.

Nitric Acid is a compound of nitrogen, oxygen, and hydrogen, represented by the formula HNO_3 . It has been known for many centuries, and was largely used by the alchemists as a solvent for different metals, and especially for dissolving away silver from a mixture of this metal with gold. Its composition was first shown by Cavendish towards the end of the 18th century. It is manufactured by heating together Chili saltpetre (sodium nitrate) and sulphuric acid in large iron retorts connected with a series of earthenware condensers into which

the nitric acid distills. The reaction is represented by the equation



When pure, nitric acid is a colourless liquid which fumes strongly in the air, having, if concentrated, a specific gravity of 1.559. The ordinary commercial nitric acid, however, is always coloured yellow owing to the presence of dissolved oxides of nitrogen, and contains usually chlorine, sulphuric acid, oxides of iron, and frequently iodine as impurities. If boiled, pure nitric acid partially decomposes into water and oxides of nitrogen, yielding finally a dilute acid boiling at 120.5°C ., and containing about 58 per cent. of HNO_3 . Nitric acid is very largely employed both in pure chemistry and in various industrial processes. Thus, considerable quantities are used in the manufacture of sulphuric acid, nitro-glycerine, gun-cotton, the aniline dyes, etc. Its salts are called nitrates, and of these many also are important from their technical uses. Silver nitrate is very largely employed in photography; potassium nitrate [NITRE] has innumerable applications, while many others are of service in the dyeing industry and in the manufacture of fireworks. The acids and salts are also invaluable reagents in the chemical laboratory, both in analysis and in organic synthesis.

Nitrification. When organic nitrogenous matter, such as animal refuse, decayed vegetation, manure, etc., is exposed to the air, a portion of the nitrogen becomes converted into nitric and nitrous acids; and then, by combination with bases such as lime or potash, into the salts nitrates and nitrites. This change is termed nitrification, and, by the experiments of Warrington, Winogradsky, and others, has been shown to be due to the vital activity of certain micro-organisms (bacteria) present in the soil. In soils where these are absent nitrification is not effected. The action proceeds best at a moderately high temperature and in moist porous soils. It is of the utmost importance agriculturally, as plants are unable to obtain their supply of nitrogen directly from the nitrogenous organic matter present in the manure, but can obtain it from the nitrates and nitrites produced from it. Nitrification has also been employed as a source of nitre; heaps of dung, etc., being well watered with urine and exposed to the sun until the action has proceeded far enough, when the nitre is extracted with water. The vast beds of nitre and Chili salt-petre existing in many localities, as *e.g.* Chili and Peru, are believed to have been produced by this fermentative action of similar bacteria.

Nitro-Compounds. In inorganic chemistry the term *nitro* has not a perfectly definite signification; in organic chemistry, however, the term *nitro* is applied to such compounds as contain the group NO_2 combined with other radicals, the nitrogen of the nitro group being directly united to a carbon atom. Many of these compounds are very important bodies, especially in the case of the aromatic series, where they can usually be prepared by the direct action of nitric acid. Of these nitro-benzene

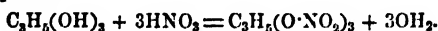
$\text{C}_6\text{H}_5\cdot\text{NO}_2$, known also as oil of mirbane and artificial almond oil, is important as being the source of aniline and hence of many other important products. Similar compounds of naphthalene also are useful in synthesis of different dyes. A compound of carboic acid with three such nitro groups is known as picric acid, a carbazotic acid $\text{C}_6\text{H}_2(\text{NO}_2)_3\text{OH}$, and is employed for manufacture of explosives and for staining microscopic slides.

Nitrogen ($\text{N}=14$) is a gaseous element which composes about four-fifths of the volume of the terrestrial atmosphere. It was discovered by Rutherford in 1772, and later Scheele and Lavoisier demonstrated its existence in the air. It is found in many minerals, usually as salts of nitric acid, or as ammoniacal compounds, and is an essential constituent of the organic compounds known as proteids and albuminoids and the alkaloids. It also enters into the composition of all living matter, both animal and vegetable. If phosphorus be burnt in a closed vessel of atmospheric air inverted over water, it combines with the oxygen to form an oxide which dissolves in the water. The water rises to about one-fifth the volume of the jar, *i.e.* the volume of this oxygen, and the remaining space contains only nitrogen. It may also be prepared by other methods, and is thus obtained as a colourless odourless gas, which is characterised by its remarkable inertness, combining directly with but very few substances. It does not support life or combustion, so that animals die and lighted tapers are extinguished if placed in the gas. It can be burnt, but is only very slightly soluble in water. At very low temperatures and under high pressures it may be liquefied to a colourless liquid, and, by further cold, solidified. In the atmosphere the nitrogen plays an important part by acting as a diluent of the oxygen and weakening its otherwise too powerful and energetic oxidising properties. The loose affinity of nitrogen makes it most valuable as the basis for explosive materials.

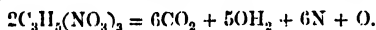
Nitrogenous Bodies. [FOOD.]

Nitroglycerine was discovered in 1847 by Sobrero, who produced an explosive liquid by stirring up glycerine with a mixture of sulphuric and nitric acids. The discovery was not, however, practically applied until Alfred Nobel (1833-1896), the Swedish engineer and chemist, made use of it and manufactured nitroglycerine. Various improvements in the detail of the manufacturing processes have been since introduced, and the method by which almost all this substance is now produced is that used by the Explosives Company at Ardeer, in the parish of Stevenston, Ayrshire. Here the glycerine is injected into the mixed acids, which are contained in lead tanks, kept cool. The glycerine is immediately converted into the nitro compound, and as by the change much heat is liberated the operation has to be carefully watched and the temperature kept well under control. At the close of the operation the whole charge—about three or four tons—is run into another tank, where the nitroglycerine collects and rises to the surface of the mixed acids. It is then drawn off and washed

free from acid by (1) cold water and (2) a weak alkali. The reaction may be represented by the equation



The sulphuric acid experiences no change, but acts as an absorbent of the water produced. Usually about two parts are obtained from one of glycerine, the theoretical quantity being 2.47. Experimental trials have, however, given yields as high as 2.35. The glycerine and the acids employed are always of the utmost purity, and all the operations are conducted with the strictest care and with absolutely no deviation from uniformity. So obtained, nitroglycerine is an oily liquid of specific gravity 1.60. If pure it is colourless, but it is usually brown. It is soluble in ether, benzene, etc., but almost completely insoluble in water. If cooled it solidifies, and it may be obtained crystalline. Its chemical constitution is not that of a true nitro compound, but it is really that of a glycerine salt of nitric acid. It possesses no odour, but has a sweet, sharp, and aromatic taste. A drop taken internally produces violent headache and pains in the back, while larger doses may cause unconsciousness. Although similar symptoms at first follow manipulation with the compound, yet habitual workers feel no ill effect from its use. It is employed to some extent medicinally, especially in diseases of the heart: e.g. in angina pectoris. If ignited by a small flame nitroglycerine burns without explosion. It detonates violently, however, if struck or if touched by a red-hot body, and may be readily exploded by the detonation of a small fulminate cartridge. The decomposition may be represented thus:



The gases thus formed would occupy, at the temperatures produced by the explosion, a volume about 6,000 times as great as that of the nitroglycerine itself, so that the pressure produced is enormous and explains the immense power of the compound as an explosive. In equal bulks, it is usually regarded as about nine times as powerful as gunpowder.

Owing to many serious explosions which followed its introduction, it fell into disrepute as an explosive; and, owing to legislative restrictions, it is never used alone as such in the United Kingdom, but is immediately transformed into some other preparation. Of these there are two classes: those in which the nitroglycerine is absorbed by (1) an explosive, (2) a non-explosive absorbent. Of these preparations dynamite is the best known. Kieselguhr dynamite is prepared by mixing up the explosive liquid with well-calced kieselguhr, which absorbs about three parts of the compound to form a buff-coloured plastic mass. It freezes at about 40° F., and has to be thawed before use, hot water being best adapted for this. Although not as sensitive to detonation as nitroglycerine itself, yet its use requires the strictest care, neglect of which has led to many serious and fatal accidents. Other varieties of dynamite are also used containing less nitroglycerine than the above No. 1 compound,

while frequently other ingredients are mixed with the infusorial earth. Other absorbents are also often employed, as magnesia alba, mica powder, etc., and the products known under a variety of names. Of the class of preparations with explosive absorbents, blasting gelatine is that most commonly used, while other products under names of forcite, lithofracteur, ammonia dynamite, lignine dynamite, Hercules powder, etc., are also employed.

Nitrometer, an instrument used for the rapid volumetric estimation of a number of commercial and chemical products. It derives its name from its original use for the estimation of nitric oxide, which can be speedily effected by its means.

Nitzsch, KARL LUDWIG, Protestant theologian, was born on August 6th, 1751, at Wittenberg, in Saxony, where he afterwards became pastor, professor and, in 1813, director of the Seminary for preachers. He died on December 5th, 1831. KARL IMMANUEL NITZSCH, his son, was born at Bornä, Saxony, on September 21st, 1787. He was educated first at home and entered the University of Wittenberg in 1806, graduating in 1809. Ordained deacon in 1811, during the siege of the city, in 1813, he worked enthusiastically in its defence. In 1817 he became a preceptor in the Seminary for preachers, founded when the University was suppressed. He was appointed Superintendent in Kemberg and professor of theology at Bonn and succeeded Marheineke in Berlin (1847), and subsequently was appointed University preacher, provost of St. Nicolai (1855), and member of the Supreme Council of the Church, dying on August 21st, 1868. One of the ablest representatives of the broad evangelical school in Germany, he left several theological works of high repute. GREGOR WILHELM NITZSCH, his brother, philologist, was born at Wittenberg on November 22nd, 1790, and died at Leipzig on July 22nd, 1861. He was professor of Ancient Literature at Kiel (1827) and at Leipzig (1852). The elucidation of the Homeric poems was the chief subject of his published works and he defended the unity of their origin. KARL WILHELM NITZSCH, his son, was born at Zerbst, Anhalt, Germany, on December 22nd, 1818, and held professorships at Kiel, Königsberg and Berlin. His writings include studies of Polybius, the Gracchi, and histories of the German people and of the Roman republic. He died on June 20th, 1880. FRIEDRICH AUGUST BERTHOLD NITZSCH, theologian, son of Karl Immanuel, born on February 19th, 1832, at Bonn, was appointed Professor of Theology at Giessen in 1868, and at Kiel in 1872. He has written on the *System of Boethius* (1860), *Luther and Aristotle* (1883).

Noailles, DE, the name of a noble French family, which settled at Noailles in the old province of Limousin (the present department of Corrèze and portion of that of Haute Vienne) in 1023, the principal of whom was ADRIEN MAURICE, Duke of Noailles, who was born in Paris on September 29th, 1678. He served with distinction in Spain, and in 1698 married. He held several high posts, being President of the Council of Finance, and a member

of the Council of Regency in 1715. He was exiled through Cardinal Dubois, but was reinstated in 1723. In 1734 he served in the Rhine campaign, and received a marshal's staff. He then commanded an army in Italy, and held a command on the Rhine. Old age, however, compelled him to retire, and he became a minister. He died in Paris on June 24th, 1766. He was a splendid officer, and his soldierly qualities were inherited by his two sons, who, in 1755, were made marshals. His *Memoirs* were published by the Abbé Millot in 1777.

Nobel, ALFRED BERNHARD, chemist and engineer, was born in Stockholm, Sweden, on October 21st, 1833. As a young man he was an assistant in his father's engineering works, but in 1859 he turned his attention to chemistry, and in 1862 introduced nitroglycerine as an explosive. The dangers attending the use of this substance (Nobel's own laboratory was blown up) led to its being prohibited in several countries, and he at once began to study some method of manufacturing it which might make it commercially available. The result of experiments was his invention of dynamite (1867). Eight years later he compounded blasting gelatine, a still more powerful explosive, and in 1887 he produced ballistite, a smokeless powder. His claim that his patent covered cordite involved him in lawsuits with the British Government, the courts ultimately deciding against him. Nobel died at San Remo, Italy, where he had a laboratory, on December 10th, 1896. He had amassed an enormous fortune, part of which he bequeathed to the founding of five prizes, each of the value of about £10,000, to be awarded annually. Three prizes were to be given for the most valuable discovery or improvement in the domain (1) of Physics, (2) Chemistry, and (3) Physiology or Medicine. The fourth prize was to be bestowed on the author of the most idealistic work in literature, while the fifth was to go to the person who should have done most to promote the brotherhood of man, international peace, and the reduction of bloated armaments. The prizes were to be conferred without respect of nationality. The Nobel Foundation is administered by a Board of Control in Stockholm.

Nobility signifies hereditary distinction of rank which raises a person above the condition of the people. It is not a political term, and should not be confused with aristocracy which, in the original interpretation, means government by the few best fitted to govern. Nobility often carries with it political privileges, but in the strict sense it is the handing on from generation to generation of some acknowledged pre-eminence founded simply on hereditary succession. One of the purest types of nobility was afforded by the Venetian oligarchy. Here the nobility arose out of wealth created by commerce; a certain number of families grew richer than others, and gradually absorbed all political power and privilege into themselves and their descendants. Here, too, on account of its political supremacy the Venetian nobility was an aristocracy as well. Its purity lies in the fact that it is only in a nobility such as this, to which no man can be

admitted, and from which none can be excluded, except by the will of the noble class itself, that we see nobility in its real form. Nobility has often been connected with monarchic government, but monarchy is in no way essential to its prosperous existence; in a monarchy, indeed, where the king can ennoble, the ideal of the Venetian nobility obviously cannot be kept up. There was a prince at Venice, but he was merely a magistrate, and neither prince nor people could affect the character of the nobility. That body could only be elevated or degraded by its own act.

The origins of the old nobilities vary considerably. In Venice, as we have seen, nobility was acquired out of wealth. The patricians of ancient Rome became the nobility from a different cause, namely, older settlement. In the beginning the privileged class, the *patres* or patricians, were the whole Roman population—the true *populus Romanus*, a self-contained community inhabiting the Roman hills. As new settlers came, either voluntarily or forced by conquest, there arose a secondary Roman people, the *plebs* or commons. The older people, being then the stronger, declined to admit the *plebs* to a share in their possessions and powers, and thus became a nobility wielding aristocratic privileges, and wholly apart from the new people by their side. After a long struggle between patrician and plebeian, in the course of which the latter gradually obtained political and social equality with the former, the old nobility had to give way to a new class, half-patrician and half-plebeian, to which the name of *nobilitas* was given. This new body was a social caste rather than a privileged class; there was this essential difference between the old and the new, that while in the former state of things the plebeian was shut out from the patrician by law, in the new state no law shut out the new man. Yet, in spite of the fact that the new patricians had no legal advantage over other citizens, their social superiority was recognised and, wherever possible, they used their superiority to exclude the plebeian from higher offices. The result was that the Roman *nobilitas* remained a distinct and real force until the break-up of the empire. The institution of the old patriciate at Athens was similar to that at Rome, and up to a certain point its development took a similar course. A nobility of older settlement was gradually deprived of its exclusive privileges. The reform of Clisthenes, aiming at the breaking down of differences between patrician and plebeian, corresponds with the reform of the Roman Licinius. But there never arose a body at Athens that was like the later *nobilitas* at Rome; the constitution of the Athenian *demos* was not favourable to fusion between the patricians and the leading plebeian families, such as that which in Rome kept office by the force of a social tradition. The Athenian *patres*, when they lost their privileges, lost them very thoroughly. They did not hand them over, in mutilated form, to their successors, as did the Roman patriciate. The Spartan nobility differs both from the Roman and the Athenian, in tracing its origin to direct conquest. Spartan nobility was to the last less of a nobility among other Lacedæmonians than Sparta itself was a ruling

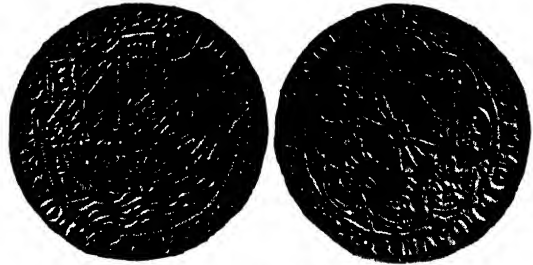
city among other cities of the country. In Rome the original *populus* was democratic within itself, and only owed its nobility to the upgrowth of the *plebs* within the walls. The Spartan nobility was a *populus* to begin with, and a *populus* it remained. Its powers and responsibilities were increased by conquest, but it never had a *plebs* to contend with, and it began and ended as that at Rome began.

Like the original Roman patriciate, the older Teutonic nobility was immemorial in its origin, its immemorial character appearing in the legend in the *Rigsmå Saga*, which narrates the separate creation of *jarl*, *karl*, and *thrall*—otherwise the three classes of mankind, noble, simple freeman, and bondman. And here the king is not distinct from or above the nobility; he is simply the noblest of the noble. The nobility of modern and mediæval times traces its origin rather to the nobility of office than to this immemorial nobility. The Norman nobility, for instance, was a nobility of office, owing its creation and continuance to personal service to the king in civil and military matters, which was rewarded by the grant of lands and developed into feudalism.

At the present time the higher nobility of England consists of the five temporal ranks of the peerage—duke, marquis, earl, viscount, and baron, who are members of the Upper House of Parliament. By the Appellate Jurisdiction Act of 1876, amended in 1887, Life Peers, styled Lords of Appeal, were created out of the legal profession. Under the Acts of Union with Scotland and Ireland, the Scottish peers elect sixteen of their number to represent them in the House of Lords in each parliament, and the Irish peers are represented by twenty-eight of their number elected for life. All these peers of the United Kingdom have the right to a seat in the House of Lords and the privilege of being tried by their own peers for felony, treason, or misprision of treason. Archbishops and bishops are Lords Temporal but not peers. In France the Revolution overthrew all distinctions of rank. By the decree of the National Assembly, passed in June, 1790, hereditary nobility was declared to be an institution incompatible with a free State. Tithes, arms, and liveries were abolished, and the records of the nobility were burned. However, the old nobility was again revived at the Restoration. The Spanish "*grandee*" boasts a special antiquity and purity of blood; the inferior class of nobility are called *Titulados*. In Spain the term "*hidalgo*" implies nobility, and, strictly speaking, the right to the title "*don*" is confined to the *hidalgo*, though it is now extensively used by persons having no proper claim to it. In Germany the test of complete nobility is that a noble should be able to show eight or sixteen quarterings, in proof of purity of blood for four or five generations. All the German States recognise three distinct grades of nobility. The highest of these grades consists of the members of reigning houses and the descendants of the sovereign nobility of the old empire, who have been deprived of sovereign power in accordance with special treaties between the State

and the princes. Lesser counts and barons compose the second grade, and the third includes the knights and patrimonial proprietors. The Swiss patricians lost their ascendancy with the decline of the Bourbons. Titular hereditary nobility existed in Norway till 1821, but was then abolished. In Sweden it still survives.

Noble, an old English gold coin current for 6s. 8d. It was first minted by Edward III., and afterwards by Henry IV., V., and VI., and by Edward IV., who made one variety (called the *rose noble*) which was worth 10s. In the old noble the obverse side bore a picture of the king in a ship, while the reverse had the inscription, "Jesus



ROSE NOBLE OF THE TIME OF EDWARD IV.

antem transiens per medium illorum ibat," taken from St. Luke (iv. 30). There were many varieties of the noble, and it was copied to a large extent in the Low Countries. It has been conjectured that it received its name because it was made of noble metal. This reason does not seem convincing.

Noctua, one of the principal divisions of moths, including over 300 British species. They fly at night, and therefore are generally of a dull brown colour. The *chrysalides* are also brown; they are common in the *somites* in the soil around the roots of trees.

Noddy, a bird of the genus *Anous*, of the Gull family, with seven species from tropical and temperate zones. They are generally placed in a sub-family with the Terns, but the tail is not forked, and the fore part of the under mandible is bent at an angle. They feed on molluscs and small fish, and the general plumage is dusky. The Common Noddy (*A. stolidus*), about 15 inches in length, is abundant in the Atlantic and the Pacific. These birds owe their uncomplimentary popular and scientific names to their apparent stupidity, as manifested by their fearlessness of man on his visits to their island breeding-places to gather their eggs, which are excellent eating.

Node, in *botany*, the part of the stem from which the leaf is given off. It often, especially in herbaceous plants, has a distinct internal structure. Thus, in *Chara*, whilst the "*internodes*," or parts of the stem between the nodes, are each made up of one long cell, the nodes are short and multicellular. In most grasses, including even the

arborescent bamboos, whilst the internodes are hollow, the crossing of the fibro-vascular bundles renders the nodes solid. In pinks and some other plants the stem is swollen externally at the nodes. The horse-tails (*Equisetum*) and some other herbaceous plants are articulated, or separate readily into segments at the nodes.

In *physics*. Consider a vibrating cord, and imagine that two wave motions are simultaneously travelling along the cord in opposite directions. At a certain point a crest of the wave moving in one direction will meet a trough of the wave moving in the reverse way. At that point, therefore, the cord will remain at rest, and such a point is called a node.

In *acoustics* nodes can be easily exhibited by the monochord. If the wire be touched at a distance of, say, one-sixth of its length from one end, and a bow be drawn across the longer part, nodes will be seen to occur at distances of $\frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \dots$ from the end. Small strips of paper can be hung on the wire at these points without being shaken off, showing that the wire is not moving there. When a sound-wave is reflected by an obstacle in its path, as, for instance, from the closed end of an organ-pipe, a node will occur at any distance which is a multiple of half a wave-length from this closed end.

In *astronomy* nodes are the points in which the orbit of a planet intersects the plane of the earth's orbit—i.e. the plane of the ecliptic. When the planet passes from the south to the north side of the ecliptic it is said to be passing through its ascending node, and the other is known as the descending node.

Nodier, CHARLES EMMANUEL, author and bibliographer, was born at Besançon, France, on April 29th, 1780. Showing a precocious bent towards letters, in 1797 he became assistant-librarian at Besançon. His Jacobin sympathies and attacks on the Consul made him obnoxious to Napoleon, and he spent some time in prison as well as in hiding. In 1809 he accepted the chair of literature at Dôle, but gave up the post in three years for journalism, which he was free to practise after the fall of Napoleon. In 1820 appeared, in the *Nain Jaune*, his celebrated attack on the Emperor. He was appointed librarian of the Arsenal in Paris in 1824, and henceforth led a purely literary life in company with the Romantics, then blossoming into fame, among whom were Victor Hugo, Lamartine, Sainte-Beuve, Vigny, the Deschamps, and Musset. He was elected a member of the Academy in 1833, and died in Paris on January 27th, 1844. He was a man of varied gifts, an entomologist of no mean order, a philologist and bibliographer, and also a playwright. His short stories and fairy tales display his powers at their best, and of these works may be mentioned *Smarra* (1821), *Trilby ou le Latin d'Argail* (1822), *Histoire du roi de Bohême et de ses sept châteaux* (1830), and *La Fée aux Miettes* (1832).

Nodau, BARON, general, was born in Japan in 1844. He fought on behalf of the Mikado during the war of the restoration (1868) and assisted in

crushing the Satsuma rebellion. In the campaign against China (1894-5) he took the town of Pinyang and played a prominent part in the Russo-Japanese War of 1904, rendering important service in the battle of Liao-yang, and in the subsequent operations around Mukden.

Nogay, a historical people of Turki (Tatar) stock, who are scattered over south Russia, the Crimea, and Caucasus. The chief divisions are Kara-Nogai ("Black Nogai"), Kalans-Jembuluk, and



NOGAY.

Kalans-Sabla, with a total population of over 100,000, of whom about half are now settled in the government of Stavropol. All are still Mohammedans, but have mostly abandoned the nomad life.

Noisseville, a village of Lorraine, 5 miles E. of Metz. It was the scene of an important engagement in the Franco-German War. On the 31st of August, 1870, Marshal Bazaine with 120,000 men attempted to drive back the Germans besieging Metz. His great numerical superiority gave him some success over Manteuffel, whose force numbered 41,000, but, the Germans being strengthened during the night, Bazaine abandoned the effort to break through and next day retired upon Metz.

Nollekens, JOSEPH, sculptor, was born in London on August 11th, 1737. He was placed with Peter Scheemakers, the sculptor, and before he was twenty had gained several of the Society of Arts' prizes for figures and bas-reliefs in clay. In 1760 he went to Rome, where he was fortunate enough to meet David Garrick and Laurence Sterne, of both of whom he produced excellent busts; but he made most money by trading in antiques. In 1770 he returned to England and immediately entered upon a lucrative practice. He became an associate of the Royal Academy in 1771, and next year a full member. He was a man of miserly habits, and on his death in London, on April 23rd, 1823, left a fortune of £200,000. From George III. downwards his sitters embraced nearly all his famous contemporaries, amongst his most admired busts being those of Dr. Johnson, Oliver

Goldsmith, William Pitt and Charles James Fox. Of his ideal statues his several renderings of Venus enjoyed great favour, the best of these being "Venus with the Sandal," "Venus Chiding Cupid," "Venus Anointing her Hair," and the "Seated Venus."

Nom de plume, a French phrase literally meaning "pen name," invented in England and erroneously used in the sense of a supposititious name, *i.e.* a name adopted to conceal a writer's identity. "Fiona Macleod," for example, successfully screened its owner, William Sharp, till his death in 1906. "Junius" is the outstanding instance of a pseudonym that has defied every effort certainly to penetrate the disguise, though many endeavours have been made to pierce it. The more correct French expression would be *nom de guerre* (the name the soldier elects to be known by when he enlists). [PSEUDONYM.]

Non-commissioned Officers, soldiers not having a commission, subordinate to the officers, as sergeants or corporals in the army, and quartermasters and gunners' mates in the navy. They are promoted from among the men, because of their good conduct, ability and education, having to pass examinations to demonstrate their capacity to control their fellows, to teach drill and other duties. They are the connecting link between the commissioned officers and the privates, having special privileges and may themselves obtain commissions. They superintend the men's mess and are responsible for their efficiency. The sergeants have their own mess, and the corporals, the rank next below, usually have their own room also.

Nonconformist, or DISSENTER, in general terms, one who refuses to conform to the doctrine, usage, ritual, or authority of an established church. The word is not in common use outside of the United Kingdom, where it is currently employed in England and Wales. Originally it was applied to those clergymen in England who, from conscientious motives, were unable to subscribe the Act of Uniformity (1662), requiring assent to the contents of the Book of Common Prayer. A Nonconformist at first was, says Richard Watson Dixon (1833-1900), in his *History of the Church of England*, "a churchman who differed from other churchmen on certain matters touching Order, though agreeing with them in the rest of the discipline and government of the Church." Afterwards it acquired a wider meaning and expressed the difference between episcopacy, as an established form of Church government recognised by the State, and all other churches, sects, and persons. Thus, in England, Catholics, Presbyterians, Jews, Baptists, Methodists, Congregationalists, Unitarians, Swedenborgians, Agnostics, Freethinkers and the rest are all Nonconformists. For generations Dissenters suffered under the gravest disabilities, but the more serious grievances have been redressed by Parliament. Necessarily the disestablishment of the Church of England would give the word only a historical significance and interest.

Non-Intervention, the policy of non-interference on the part of one nation in the affairs of another.

Nonius, MARCELLUS, a Latin grammarian, of whose life nothing is known. He was the author of a treatise entitled *De Compensiosa per Litteras ad Filium*, a work divided into eighteen chapters. The first twelve are devoted to different grammatical subjects, whilst the last six are in the style of Julius Pollux, each containing a series of technical terms. Nonius probably lived between the second and sixth centuries of the Christian era.

Nonjurors, clergymen of the Church of England who refused to take the oath of allegiance in 1689 to William III. and Mary, on the plea that they were still bound by their former oath to James II., unless a change in the order of succession were the result of conquest which, obviously, in this case, did not apply. The party, headed by William Sancroft, Archbishop of Canterbury, Bishop Ken, and five other bishops, numbered some four hundred clergymen, who were deprived of their sees and livings. They kept up an episcopal succession on nonjuring lines for more than a hundred years, but in 1805, when their last bishop died, they had declined to a mere remnant.

Non-Palliate, a sub-order of mollusca belonging to the class Gastropoda and the sub-class Anisopleura. It comprises those forms which have a slug-like body, and have lost both the mantle and shell of the ordinary mollusca. It includes the commonest of the group of Sea-Slugs and Sea-Lemons, such as *Doris*, *Elysia*, etc. The members of the group are all marine, and are usually found crawling in pools and over rocks in comparatively shallow water.

Nord, the most northerly department of France (hence its name). The English Channel forms the northern boundary, and Belgium lies on the N.E. and E. It covers an area of 2,229 square miles. The length from N.W. to S.E. is 112 miles; the breadth, which nowhere exceeds 40 miles, becomes only four at the point where the department is traversed by the Lys. Nord is watered by the Scheldt, Sambre, and Oise. The first of these rivers divides it into two parts, that on the east being hilly and woody, whilst the west portion is a fertile and perfectly level plain. The principal crops are wheat, oats, barley, rye and potatoes, but flax, tobacco and hops are also grown. The raising of live stock is a flourishing occupation, the density of the population favouring all branches of agriculture and dairying. The department is rich in minerals, especially coal, and the cotton, linen, woollen, lace, iron, steel, beet-sugar, alcohol, chemical, machinery, and other manufactures are very important. Lille (pop. 215,431) is the capital, and other large towns are Roubaix (124,660), Tourcoing (79,468), Dunkirk (40,329), Douai (33,918), and Cambrai (26,586). Pop. of Nord (1901), 1,877,647.

Nordau, MAX SIMON, German philosopher, was born, of Jewish descent, at Budapesth, Hungary, on July 29th, 1849. After studying medicine at

Budapesth, he travelled throughout Europe. He then practised as a physician in Pesth (1878) and Paris (1880). In *From the Kremlin to the Alhambra* (1880) he gave an account of his travels, but attained fame by his more philosophic works. In 1884 he published *Conventional Lies of Society*, in which he attacked social, ethical, political, and religious principles. *Paradoxes* (1885) contains a scathing criticism of contemporary romances, and in *Degeneration* (1893) he contends that the most conspicuous examples of modern Art and Literature merely furnish conclusive evidence of physical and intellectual deterioration. A man of vast erudition, of great originality of thought, and shrewd insight, Nordau remains an optimist in spite of his keenness in discovering mental and moral maladies, holding that the feeble and the degenerate will perish, whilst the strong will mould the conditions of Society by force of intellect and will. Besides those already mentioned, some of which created an immense sensation, his works include *Paris under the Third Republic* (1881); *Selected Paris Letters* (1887); his plays, *The New Journalists*, written in collaboration with F. Gross (1880), *The War of the Millions* (1882), and *The Right to Live* (1894); and his novels and romances, *Soap-bubbles*, *Pen Sketches and Stories* (1879), *The Illness of the Century* (1889) and many others.

Nordenskiöld, NILS ADOLF ERIK, BARON, Arctic explorer, was born at Helsingfors, in Finland, on November 18th, 1832. He studied in the university of his native town, and afterwards at Berlin, devoting himself especially to mineralogy and other sciences. Having incurred the suspicion of the Russian Government, he was compelled to remove to Sweden, and in 1858 became director of the mineralogical department of the Royal Museum at Stockholm. Between 1861 and 1873 he led four expeditions to Spitsbergen, that of 1864 being devoted to the measurement of an arc of the meridian. His success in navigating the Kara Sea as far as the mouth of the Yenisei (1875) convinced him of the practicability of a sea route through the Arctic Ocean to Behring Strait; in 1878 he accomplished this voyage in the *Vega*, reaching Yokohama in September, 1879. On his return he was created Baron. In 1883 he visited Greenland, which he had not explored since 1870. Besides his *Voyage of the Vega* (1881), *Studies and Investigations* (1885), and other works, Nordenskiöld produced, with great thoroughness and research, the *Facsimile Atlas* (1889), a reproduction of geographical documents of the 15th and 16th centuries, and *Periplus* (1897), a history of early cartography and sailing charts. He died in Stockholm on the 12th of August, 1901.

Nordhausen, a town of Prussian Saxony, on the Zorge, at the south base of the Harz Mountains, 38 miles N.N.W. of Erfurt. The buildings include a late Gothic cathedral, with a Romanesque crypt; a church dedicated to St. Blasius, containing two pictures by Lucas Cranach; and a mediæval town-hall. There are important breweries and distilleries, and cloths, leather, tobacco, sugar and chemicals are manufactured. Pop. (1900), 28,437.

Nore, a sandbank in the estuary of the Thames, three miles N.E. of Sheerness. The name is also applied generally to the anchorage (7 to 10 fathoms) in the vicinity. The first lightship moored here (1731) was also the first to be placed off the English coast. Mutiny among the sailors of the British fleet lying at the Nore broke out on May 20th, 1797, and was not suppressed till June 13th. Richard Parker, the ringleader, was hanged at the yard-arm of the *Sandwich* on June 30th, and other agitators were executed later.

Norfolk, a maritime county of England, bounded by the North Sea on the N. and E., Cambridgeshire and Lincolnshire on the W., and Suffolk on the S. It occupies an area of 2,044 square miles. The greatest distance from N. to S. is 70 miles, and the extreme breadth 43 miles. The land adjoining the sea-coast, which is over 90 miles in length, is in almost all parts low and flat; but in the interior the surface, though it nowhere rises to any great height, is undulating and well wooded. Much destruction is caused by the encroachments of the sea, especially near Cromer, but along the shores of the Wash an extensive tract of good land has been reclaimed. The chief rivers are the Yare, which rises in the centre of the county and flows eastwards, with its tributaries the Waveney and the Bure, and the Ouse, which flows northwards to the Wash near the west border. Much of the eastern part of the county is composed of the shallow lakes called Broad. The soil consists for the most part of light sand and loam. Ever since Lord Townshend introduced high farming on his estate at Rusham, Norfolk has taken a leading place amongst the agricultural counties; winter roots, especially, are cultivated with great success. A considerable acreage is under market gardens and orchards. There is good pasture-land along the banks of the rivers and on the Cambridgeshire border, and many turkeys and geese are reared for the London markets. The most noted of the numerous fisheries along the coast is the herring industry at Yarmouth. The manufactures include textiles, machinery, agricultural implements, mustard, paper, and silk, besides printing and brewing. The chief points in the history of Norfolk or East Anglia are the settlement of the Flemish weavers at Worstead, from which place their yarn derived its name of worsted, in the 14th century, and Ket's rebellion (1549). Among distinguished natives were Tom Paine, Sir Robert and Horace Walpole, Lord Nelson, Elizabeth Fry, George Borrow, George Cattermole, "Old" Crome, and H. Rider Haggard. Pop. (1901), 460,040.

Norfolk, a seaport of Virginia, United States, on Elizabeth river, an arm of Chesapeake Bay, 86 miles S.E. of Richmond. Several railways and canals converge here, and there is communication by steamer with New York, Richmond, and other towns. Norfolk has a large naval yard, and carries on a considerable trade in cotton, fruit, vegetables, oysters, maize, and sugar. The fight between the Federal *Monitor* and the Confederate *Merrimac* took place off Norfolk in 1862. Pop. (1900), 46,621.

Norfolk Island, a dependency of New South Wales in the Western Pacific, about 450 miles N.W. of the north point of New Zealand. It contains an area of $13\frac{1}{2}$ square miles. The mean altitude of the cliffs is 400 feet, whilst Mount Pitt, in the centre, rises 1,039 feet above the sea. The climate is healthy. The chief product is the Norfolk Island pine. The Norfolk Island cabbage is a dwarf pine. The island, discovered by Captain Cook in 1774, was a penal settlement from 1788 to 1805 and from 1826 to 1855. The descendants of the *Bounty* mutineers were removed hither from Pitcairn Island in 1856. Pop. (1901), 971.

Norman Architecture, a round-arched variety of mediæval architecture derived from the Romanesque. It was introduced into England before the Conquest, and lasted until the end of the 12th century, when it gradually changed to the



NORMAN ARCHITECTURE : THE WHITE TOWER, LONDON.

Early Pointed. The principal feature of Norman architecture was its massive nature and rugged simplicity. The doorways are deeply-recessed with fine mouldings and rich surface sculpture. The windows are small and placed high in the wall, and the buttresses, though thick, do not project much. There is a fine Norman Porch in the Close of Canterbury cathedral, and the Keep of the Tower of London is also a good example of this style, while the Chapel of St. John in the interior of the White Tower is a simple but impressive specimen of pure Norman. The oldest building in Edinburgh—St. Margaret's Chapel in the Castle—contains some very primitive Norman work.

Normandy, an ancient province of France, now included in the departments of Seine Inférieure, Eure, Calvados, Manche, and Orne. It takes its name from the predatory bands of Norsemen who, after numerous expeditions along the coast and up the rivers of France, dating from about A.D. 840, attempted to form permanent settlements in the country. The only one of these "Normandys" that was ultimately successful was that which retained the name. By the treaty of Clair-sur-Epte (912) between Charles the Simple, king of the West Franks, and the Norse leader, Rolf or Rollo, it was agreed that the latter should retain possession of the Neustrian lands he had conquered west of the rivers Eu and Epte, but acknowledge the Frankish monarch as his overlord. The limits towards the west were less clearly defined, and Rolf's son, William Longsword (927-43), extended the duchy in that direction till it became co-terminous with Brittany. The newly-

conquered districts were mostly colonised by new-comers from Norway, who clung to their old religion, language, and customs, whilst in western Normandy Frankish influences predominated. This difference of tendency gave rise to constant dissensions, which frequently culminated in active hostilities; but the Scandinavian party were conquered by Richard the Fearless (943-96), who was aided by Louis and Hugh, Duke of Paris. In 987 Hugh of Paris usurped the west Frankish throne, and the Houses of Capet and Rollo found it to their mutual advantage to maintain friendly relations, which subsisted with little interruption till the conquest of England in 1066. Richard the Good reigned from 996 to 1026, and Richard III. from 1026 to 1028. The marriage of Emma, sister of the former, to Ethelred (and afterwards to Cnut the Great) for the first time brought Normandy into close connection with England. Richard III.'s brother, Robert (1028-35), left the duchy to his natural son, William, a child of eight. His minority and doubtful claim afforded a new outlet for turbulent forces, and a period of feudal anarchy ensued, but it was brought to a close by William's victory at Val-ès-Dunes (1047). The remainder of his reign as ruler of Normandy alone (1047-66) was spent in consolidating the royal power and aiding the civilising efforts of the Church. His vigorous policy, however, produced little permanent result, for the Conquest drew away the attention of his successors to England, so that Normandy again became a prey to feudal violence. It was the hopes of the turbulent barons which led them to support William's eldest son, Robert, rather than William Rufus or Henry I., the latter of whom finally defeated Robert at Tenchebrai (1106). With the exception of a short period in Stephen's reign, during which it was held by Geoffrey of Anjou, Normandy remained united to England till it was wrested

from John by Philip Augustus (1203-4). Edward III. regained it in 1346 and Henry V. in 1417-18, but the English lost it finally in 1450. From this date its history becomes merged in that of France.

Normanton, a town of the West Riding, Yorkshire, England, on the Calder, 3 miles N.E. of Wakefield. It has large coal mines and ironworks, and is an important railway centre. The chief buildings are the church of All Saints in the Norman and Perpendicular styles and the 16th century Grammar School. Sir Martin Frobisher, the famous navigator, was born at Altofts in the parish of Normanton about 1535. Tradition associates the traces of a moat with a Roman encampment, and Haw Hill, a mound in the vicinity, is believed to be a barrow or sepulchral mound of prehistoric times. Pop. (1901), 12,234.

Noronha, FERNANDO, a group of islands in the Atlantic Ocean, 210 miles E.N.E. of Cape San Roque, Brazil. The main island is about seven miles in length and two in breadth, and contains Pico (1,090 feet), the highest point of the group. The isles consist of a mass of volcanic rocks, with a soil of rich ferruginous clay, which affords an abundant sustenance for maize, cotton, sugar, melons, wild grasses, and various kinds of trees. The islands belong to Brazil; there is a penal settlement on Remedios. Captain Cook visited the group in 1775 and Charles Darwin in 1832. Pop., including convicts, estimated at about 2,500.

Norris, SIR JOHN, English admiral, was born about 1660, and, having entered the navy, was made a commander in 1690. In the same year he became a captain. He was present at the loss of the convoy off Lagos in 1693, and four years later was despatched to Hudson Bay and Newfoundland to counteract French activity. He served in the Mediterranean under Sir Cloudesley Shovel, was engaged in the battle of Malaga, and assisted in the capture of Barcelona, being knighted on his return to England in 1705. As rear-admiral, a rank which he reached in 1707, he forced the passage of the Var and took part in the siege of Toulon. In 1708 he was made a vice-admiral, and in 1709 an admiral. In the latter part of his career, during which he held the command in the Mediterranean and the English Channel, he was chiefly employed in watching the French and the Swedes. He died on July 19th, 1749.

Norristown, capital of Montgomery county, Pennsylvania, United States, on the Schuylkill, 18 miles N.W. of Philadelphia. The industries include iron, steel, cotton, and woollens, besides manufactures of carpets, hosiery and explosives. Pop. (1900), 22,265.

Norrköping, a town of the province of Östergötland, Sweden, at the head of the Bråvik, an arm of the Baltic, where it is joined by the Motala, 113 miles S.W. of Stockholm, by railway. There are oil-mills, sugar-refineries, shipbuilding yards, and paper, tobacco, linen, cotton, and woollen manufactures. Pop. (1900), 41,008.

Norse (originally *Norskr*, *Norsk*, from root *Nordhr*, "north"), collective name of the northern branch of the Teutonic race. In this sense the term is practically synonymous with Scandinavian, comprising the Danes, Swedes, Norwegians, and Icelanders, that is, the four main divisions of the Norse or Scandinavian group, which presents certain distinctive physical and linguistic features now best preserved in Iceland. These distinctive features do not appear to be of great age, and 2,000 years ago the Norse peoples probably differed little, either in appearance or in speech, from the other branches of the Teutonic family; but then began a gradual divergence, resulting in the present differentiation of physical and linguistic forms. Physically the Norse peoples have remained truer to the primitive Germanic type, characterised by tall, bony figures, robust frames, long head, regular oval features, blue or grey eyes, long, wavy, flaxen and even red hair, and disproportionately large extremities. At least, this blonde or "Saxon" type is still far more prevalent in Scandinavia than in Germany, where great interminglings have taken place with the dark pre-Aryan aborigines. Hence the Norse peoples, though far from the ideal blondes, now best represent Huxley's *Xanthochroi*, or "fair white," as distinct from the *Melanochroi*, or "dark whites" of southern Europe; and recent research has traced back for at least 4,000 years the presence of this blonde race in the Scandinavian peninsula, where in fact many ethnologists suppose that it originated in the Neolithic age. In early mediæval times (9th to 12th centuries) the Norsemen (chiefly Danes and Norwegians) overran a great part of Russia and the European seaboard, extending their predatory and conquering excursions from Greenland, Iceland, and the British Isles, up the Mediterranean to the Levant. They even founded flourishing kingdoms in the Seine basin (Normandy) and in Sicily, but were everywhere rapidly absorbed in the surrounding populations, except in the Faröe Islands and especially in Iceland, where they came rather as settlers than as corsairs or conquerors, and where the Norse race and speech are still best preserved. [ICELAND.] The Norse language is a modified form of Early Low German, that is, of the primitive Germanic tongue as best represented by the Gothic of Ulfphilas [GOTHIC], from which it differs partly in its phonetics (normal change of final *s* to *r*, as in Gothic *sunus*, Icelandic *sunr*, "son"), but much more in its grammatical forms. Of these the most characteristic is the evolution of a passive or rather a middle voice, and of a definite article agglutinated at the end of the noun as in Rumanian (*home-l*, "manthe") and some other south-eastern European languages. These, however, are comparatively recent changes, although traces of them occur in the Icelandic Edda, which suffixes the article, and even in the *Norrœna Tunga*, that is, the original Norse tongue as preserved in the early Runic inscriptions. They receive their full development only in Swedish and Danish, the chief modern representatives of the old language, which are thus distinguished in a marked way from all other members of the Teutonic linguistic family.

North, an English family some members of which played an important part in English history, founded by SIR EDWARD NORTH (1496-1564), an eminent lawyer, who was created Baron North of Kirtling by Queen Mary. His second son, SIR THOMAS NORTH (1535-1601), is remembered as the translator of Plutarch. DUDLEY NORTH (1602-77), 4th baron, wrote a life of his ancestor, the first lord. Four of his sons were eminent men in their day, and their memory has been preserved in the garrulous and laudatory, but fascinating *Lives* written by Roger, the youngest of the number. The eldest, FRANCIS (1637-85), was successively Solicitor-General, Attorney-General, and Chief Justice of the Common Pleas, and in 1682 became Lord Keeper with the title of Baron Guilford. SIR



LORD NORTH.

(After the painting by Romney.)

DUDLEY NORTH (1641-91) engaged in commerce and made a fortune in the Levant, passing many years at Smyrna and Constantinople. After his return to England he was appointed a Commissioner of Customs. He had a wide knowledge of architecture and possessed great mechanical skill. JOHN (1645-83) succeeded Barrow as Master of Trinity College, Cambridge, in 1677. ROGER (1653-1733) practised as a lawyer in London, but after the Revolution withdrew to his seat of Rougham in Norfolk. Besides the *Lives* of his brothers and his unfinished *Autobiography*, he wrote an *Examen* of White Kennett's *History of England*, abounding in minute details, on which Macaulay drew largely. FREDERICK NORTH, 8th Baron North and 2nd Earl of Guilford (1732-92), entered Parliament in 1754. In 1767 he was appointed Chancellor of the Exchequer and became leader of the House of Commons. As Prime Minister from 1770 to 1782

he must be held responsible for the loss of the American colonies, though he often adopted a policy against his better judgment, owing to his anxiety to please the king. After the Rockingham and Shelburne Ministries had run their course, he returned to power as one of the Secretaries of State under Lord Portland, the other being Charles James Fox; but the union of these old enemies excited universal distrust, and the Coalition Ministry was dismissed in December, 1783. He afterwards acted with the Opposition against Pitt, but in consequence of loss of sight, in 1787, he was compelled to take a less prominent part in political strife. Lord North succeeded his father as Earl of Guilford in 1790.

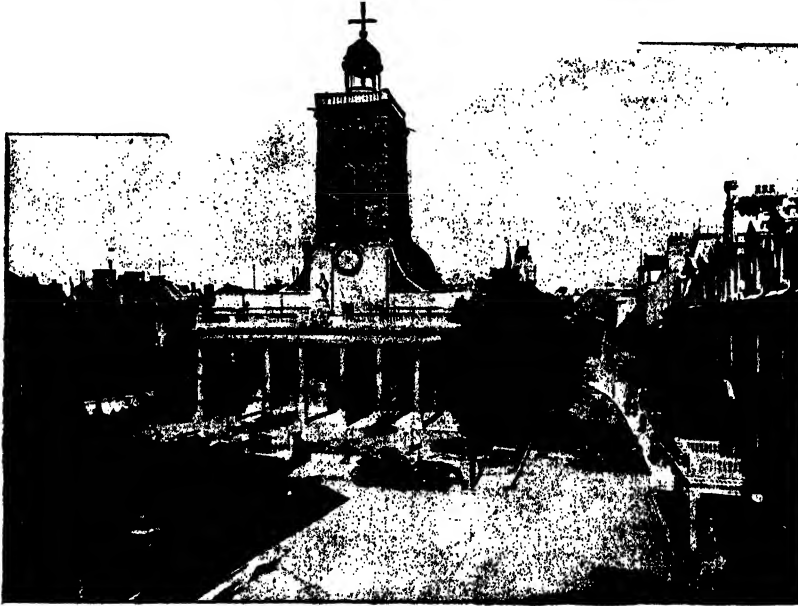
North, BROWNLOW, only son of Charles Augustus North, rector of Alverstoke, was born in Chelsea, London, on January 6th, 1810. After being at Eton he was sent, on the death of his father in 1825, to Corfu to be under the influence of his cousin, the Earl of Guilford, who had there founded a Theological College. Owing to misconduct he was sent home. After a disreputable youth in England and abroad he went to Ireland in 1828, and there married Grace, daughter of the Rev. Thomas Coffey. Again he travelled on the Continent, taking, without success, to gambling to add to his means. Eventually he settled in England and, on the advice of Frederick Robertson (afterwards of Brighton), studied for holy orders. But the bishop hesitated to ordain him and, his own doubts leading him to abandon the idea, for the following twelve years he lapsed into his old habits. In 1854 he was suddenly taken ill while card-playing. Fearing death, he determined to reform and, remaining true to his resolution, on his recovery became a successful lay-evangelist, being recognised by the Free Church of Scotland in 1859. He zealously devoted himself to his new work, conducting revivalist meetings in England and Ulster and preaching in all the important towns of Scotland. He died at Tillechewan Castle, Dumbartonshire, on November 9th, 1875.

Northallerton, a town in the North Riding of Yorkshire, England, in the valley of the Wiske, 30 miles N.N.W. of York. Though it has some manufactures of linen and leather, its interest is mainly historical. It was a Roman station and Saxon burgh. Under the see of Durham, to which it was given by William II., the town acquired great importance and became an episcopal residency. On Cowton Moor, 3 miles to the north, the English defeated the Scots on August 22nd, 1138 in the battle of the Standard. The hill on which the standard was flown is still called Standard Hill. In 1174 Henry II. ordered the strongly-fortified episcopal palace to be demolished. The Scots under Robert Bruce, plundered the town in 1318. During the Civil War Charles I. lodged in the Porch House on his way to Scotland, and in the Jacobite Rebellion of 1745 the English army, under the Duke of Cumberland, encamped near the town. The decorated cruciform church of All Saints was built soon after the sack by the Scots, and the grammar school is of royal foundation. Northallerton

ton, called, in Domesday Book, Alvestune and Alreton, and afterwards Allerton, received its present name to distinguish it from Allerton-Maulcerver in the West Riding. Pop. (1901), 4,050.

Northampton, the capital of Northamptonshire, England, on the Nen, 67 miles N.W. of London by railway. The public buildings include a town hall (1864), ornamented on the outside with statues of English kings, a county hall, and a corn exchange (1850). There are two interesting old churches, St. Peter's (Norman) and St. Sepulchre's,

In the reign of Richard I. a mint was set up and in 1258, owing to the quarrels between the students and townsfolk of Oxford, a royal licence for schools of the arts and sciences was obtained for the purpose of founding a university, but the establishment was dissolved in 1265, and teachers and taught returned to Oxford. During the Wars of the Roses Henry VI. was defeated and captured in the battle of Northampton on July 9th, 1460. Queen Elizabeth and Charles I. both visited the town, which was held for the Parliamentarians during the Civil War. Pop. (1901), 87,021.



ALL SAINTS' CHURCH, NORTHAMPTON. [Phot. Chester Vaughan, Acton, W.]

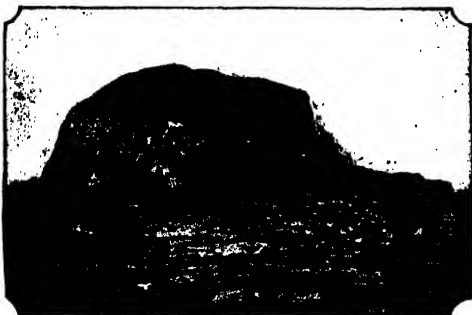
which was built for the Templars by Simon de St. Liz in 1127 and is one of the four round churches in England modelled on the plan of the church of the Holy Sepulchre at Jerusalem. All Saints' church was destroyed by the great fire which nearly wiped out the town in 1675 and rebuilt by Sir Christopher Wren five years later; the ancient tower remains. A little south of the town is one of the beautiful crosses erected by Edward I. in memory of his queen, Eleanor, in a very good state of preservation. Northampton is the centre of the boot and shoe manufacture; the other industries include leather-dressing, paper-making, and brewing. Outside the town is the racecourse, where the Pytchley Hunt races are held. Historically, Northampton possesses great interest. The Roman highway of Watling Street passes it on the west. The Danes burned the town in 1010. Its castle, of which no trace remains, was erected in the 11th century by Simon de St. Liz, Earl of Huntingdon and Northampton. Several parliaments, councils, and conventions met here, and it was often the residence of the kings.

154—N.E.

Northamptonshire, a south midland county of England, bounded by Rutland and Lincolnshire on the N., Cambridgeshire, Huntingdonshire, and Bedfordshire on the E., Buckinghamshire on the S.E., Oxfordshire on the S., Warwickshire on the W., and Leicestershire on the N.W. It has an area of 984 square miles. It is 67 miles from N.E. to S.W. with an extreme breadth of 26 miles. Excepting in the N.E., which forms part of the Fen district, the surface is mostly hilly, but the highest point, near Daventry, is only 804 feet above the sea. The chief rivers are the Welland, Nen, Avon, Cherwell, and Ouse, and there is also communication by means of the Grand Junction and other canals. The soil is generally fertile, consisting of a brown loam in the hilly district and a rich black mould in the north-eastern area, and corn-growing, cattle-rearing, and dairy-farming are all thriving. The iron industry has made great progress since the middle of the 19th century, iron ore being extracted at Kettering, Wellingborough, near Stamford (in Lincolnshire), and elsewhere; but the

leading industry is the making of boots and shoes. Other manufactures comprise clothing, the making of machinery and tools, paper and leather, besides printing and timber. The principal towns are Northampton, the capital, Peterborough (pop. 30,872, partly in Huntingdonshire), Daventry (pronounced *Jaintry*, 3,780), Wellingborough (18,412), and Kettering (8,653). The Romans occupied the shire at several parts, and their two great roads Watling Street and Ermine Street crossed the county, the former entering at Stony Stratford and leaving at Lilbourne, the latter cutting across from Castor into Lincolnshire. The shire formed part of Middle Anglia and was at one time included in Mercia and later in Northumbria. After the Conquest much of the land became a favourite royal hunting-ground, Rockingham Forest being an extensive sylvan tract. The Pychley Hunt still maintains the reputation of the shire in this branch of sport. The historical events of outstanding interest, apart from those centred around the county town, are the execution of Mary Queen of Scots in Fotheringhay Castle (1587), the battle of Naseby (1645), and the "arrest" of Charles I. at Holmby House whilst engaged in a game of bowls. Pop. (1901), 338,064.

North Berwick, a watering place, Haddingtonshire, Scotland, situated on the southern shore of the Firth of Forth, eight miles N. by E. of Haddington. It is one of the most fashionable of Scottish seaside resorts, and possesses two fine full-length golf courses besides being within easy



THE BASS ROCK.

(Phot. G. W. Wilson & Co., Aberdeen.)

access of several other first-rate links. Behind the town rises North Berwick Law, a conical hill 612 feet high, a conspicuous landmark that commands a beautiful view in all directions. Three miles to the east are the magnificent ruins of Tantallon Castle, a former stronghold of the Douglasses, enthusiastically described by Sir Walter Scott in *Marmion*, and in the sea stands, about $1\frac{1}{2}$ mile from the shore, the noble rock of the Bass, generally visited from Canty Bay. This isle, now the haunt of the solan goose, was once used as a Covenanters' prison, and, strangely enough, was the last place in Scotland held for

the unfortunate Stewarts. Pop. of North Berwick (1901), 2,899.

North Cape, the most northerly point of Europe, situated at the northern end of the isle of Magerö, which is separated from Norway by a narrow channel. The Cape lies in $71^{\circ} 11' 40''$ N. and $25^{\circ} 46'$ E. and is a rugged promontory reaching at its highest point an altitude of 968 feet. The actual northernmost point of the European mainland occurs at Cape Nordkyn, 45 miles east of North Cape.

North Carolina, a south Atlantic state of the American Union, bounded on the N. by Virginia, on the E. and S.E. by the Atlantic, on the S. by South Carolina and Georgia, and on the W. by Tennessee. It has an area of 52,250 square miles. The state may be divided into three sections, of which the most westerly is mountainous and that on the east level, with tracts of swamp, the area between them being occupied by an undulating and extremely fertile region. The Iron and Alleghany Mountains run parallel near the Tennessee border, and between them is Mitchell's Black Dome (6,711 feet), the highest summit in the United States east of the Rockies. Along the coast runs a long line of sandbanks, forming the outer barrier of the shallow lagoons. The swamp region occupies about three million acres, and includes the Great and Little Dismal Swamps. There are six large navigable rivers, of which the Roanoke and the Cape Fear are the chief. Amongst the fauna are the alligator, raccoon, opossum, rattlesnake and other venomous serpents. Excepting certain districts near the coast, North Carolina has a productive soil and a healthy climate. The chief crops are cotton, maize, oats, wheat, tobacco, sweet potatoes, and fruits which are dried for export. The pine-woods in the eastern section afford an abundant supply of timber, and here there are numerous saw-mills as well as works for the production of resin, tar, pitch, and turpentine oil. The state is rich in gold, silver, iron, copper, lead, zinc, coal, and other minerals. The manufactures comprise cotton and woollen goods, tobacco, leather, flour, and cotton-seed oil, besides cooperage and carriage-building; the fisheries are considerable. Raleigh (pop. 13,643), an inland city, is the capital, but Wilmington (20,976) is the chief port and most important town. In 1585 and 1587 Sir Walter Raleigh planted colonies on Roanoke Island, but Virginians on the northern frontier made the first permanent settlements. Charles II. in 1663 granted the province of Carolina to several proprietors, by whom it was divided into North and South Carolina. At first the Tuscaroras, Corees, Nottoways, and other Indians gave the colonists great trouble, but by 1712 the natives were overcome and retired northwards. In 1729 North Carolina acquired an independent *status* and later became one of the foundation states of the Union. In 1861 it hoisted the flag of secession and was one of the most important battle-grounds in the Civil War. Pop. (1900), 1,893,810.

Northcote, JAMES, painter, was born in Plymouth on October 22nd, 1746. He early discovered

a bent for drawing, but his father did not encourage it, keeping him at his own trade of making and mending watches. The boy persevered, however, and at last walked off to London. Here Sir Joshua Reynolds allowed him to work in his studio, though not actually teaching him. Northcote attended the Royal Academy Schools and set up on his own account in 1776. Next year he went to Italy and assiduously studied the great masters. On his return to London in 1780 he at once received numerous commissions for portraits and subject pictures, amongst his works being "Walworth killing Wat Tyler," now in the Guildhall, and several popular canvases for Boydell's Shakespeare Gallery. He was elected Associate of the Royal Academy in 1786 and a full Member in the following year. Though he had reached the zenith of his fame he continued to exercise his profession to the end of his long life. As if painting were not sufficient to satisfy his love of industry he also turned author, and published *Memoirs of Sir Joshua Reynolds* (1813), two series of *Fables Original and Select*, and the *Life of Titian* (1830). He died in London on July 13th, 1831. His portraits, well drawn and modelled, restrained in colour, and dignified in feeling, though lacking individuality, show him at his best.

Northcote, Sir Stafford. [INDSELEIGH.]

North Dakota, a north central state of the American Union, bounded on the N. by Assiniboia and Manitoba, on the E. by Minnesota, on the S. by South Dakota, and on the W. by Montana. It covers an area of 70,795 square miles. Sentinel Butte (2,709 feet), near Medora, is the highest point in the state, which contains much flat plain and undulating prairie. The chief rivers are the Missouri (with its righthand affluents the Yellowstone, Little Missouri, Knife, Heart, and Cannon Ball), the River des Laes, Souris or Mouse, James, Cheyenne, and Red River of the North, which largely serves as the eastern boundary of the state. Devil's Lake, a sheet of salt water, 40 miles long but of very irregular contour, is the only big lake. The climate is dry and healthy, although winter is long and severe, with occasional blizzards. Dakota is famous for its wheat, which is grown on the grand scale. Maize, oats, barley, flux, rye and potatoes are also valuable crops. Live-stock is of increasing importance. Coal is the only mineral of consequence, and manufactures are yet in their infancy. North Dakota formed part of the land comprised in the Louisiana purchase (1803); was organised as a Territory in 1861, then including parts of the present Wyoming and Montana; was reduced in area in 1868, and admitted to the Union in 1889. The principal towns are Fargo (pop. 9,589), Bismarck (3,319), the capital, and Grand Forks (7,652). Pop. of state (1900), 319,146.

North-East Passage, THE. The discovery by Stephen Brough in 1556 of a strait between Novaya Zemlya and the mainland gave rise to projects for finding a north-east passage from Europe to China. Attempts in that direction were made in 1568 and in 1580 by the Company of

Merchant Adventurers, and in 1594 by Barents and Linschoten. Barents made a second effort in 1595, and a third in 1596. In the course of this, after discovering the north-east coast of Spitsbergen, he perished. His discoveries, which were pushed farther and farther by successive whaling expeditions, were perfected by Wrangell in 1822, by Long in 1867, and by Nordenskiöld in 1878-9; but the route, owing to the ice, is impracticable for commercial purposes.

North Sea, often erroneously called the German Ocean, an extension of the sub-polar or Norwegian Sea, to which it lies open on its north side. The lands surrounding it are Norway, Denmark, and Schleswig-Holstein on the E., Great Britain on the W.; and Prussia, Holland, Belgium, and France on the S. It communicates with the North Atlantic by the Strait of Dover, the Pentland Firth, and the passage between the Orkneys and Shetlands, and with the Baltic by the Skager Rack and Cattegat. Its limits are lat. 51° and 61° N., and long. 2° 30' and 8° E. Its greatest length is about 600 miles, its greatest breadth (from the Firth of Forth to Jutland) about 400 miles, and its area about 150,000 square miles. The sea is shallow, especially towards the south and east, where the shore is low and flat. In general, the height of the cliffs varies directly with the depth of the neighbouring water. Excepting in the trench or belt, 50 miles in width, called the "Norwegian Gully," which encircles the south coast of Norway, the depth nowhere exceeds 100 fathoms; in the Gully soundings of 400 fathoms are not unknown. In the south central part of the sea there are numerous "pits" or "banks," the most important being the Dogger Bank, midway between North England and Schleswig, above which the average depth is only 12 or 15 fathoms. The formation of these banks is ascribed to the detrital matter remaining from the glacier which filled the sea during the Glacial period. Near the coast, shoals and sandbanks are formed from the terrigenous deposits brought down by the larger rivers. The tides of the North Sea as far south as the Thames are regulated by the north branch of the great Atlantic tidal wave, which sweeps round the north coast of Scotland, and causes high water on the shores of Scotland and Norway at almost exactly the same time. From time immemorial this sea has been an important commercial highway. It abounds in food-fishes, crustaceans, and molluscs, and the fisheries are both extensive and valuable.

Northumberland, the most northerly county of England, separated from Berwickshire on the N. by the Tweed, from Roxburghshire on the N.W. by the Cheviot Hills, and bounded on the W. by Cumberland, on the E. by the North Sea, and on the S. by Durham. It has an area of 2,016 square miles. Off the shore are Lindisfarne or Holy Isle, the Farne Islands, and Coquet Isle. The surface is for the most part rugged, rising gradually from the coast to the height of 2,676 feet, in the Cheviot Hills, and becoming wild and bleak in the moorland district of the south and south-west. Along fertile valleys which traverse the county eastwards from

the spurs of the Cheviots flow the Till, Aln, Coquet, Wansbeck, and other streams; the other rivers include the Tweed and the Tyne, which in the last part of its course forms the boundary with Durham. The geological formation consists of Silurian rocks in the north-west, with Triassic and Permian beds, and a vast tract of Coal Measures near the coast; the Cheviots are mostly composed of porphyrites and andesites. Coal-mining is carried on in the south-east, lead-mining (a declining industry) in the south-west. The valleys and the district near the sea have a clayey loam soil, yielding rich crops of barley, wheat, and beans. Cattle and sheep are reared extensively in the west part of the county. At Chillingham the Earl of Tankerville preserves a herd of the wild white cattle descended from the original British stock. The Northumberland rivers and their estuaries abound in salmon and other fish. A large group of connected industries, such as iron-working, the fabrication of ordnance, ship-building, etc., has been established along the banks of the Tyne. Alnwick (pop. 6,716) is the county town, but Newcastle-upon-Tyne, a city and county of itself, is far and away the most important town. Other considerable places are Hexham (7,071), Morpeth (50,043), and North Shields, including Tynemouth (51,514). Roman remains are plentiful, Hadrian's Wall being of pre-eminent importance. It was constructed early in the 2nd century and ran from the Solway to the estuary of the Tyne, where in fact the name of Wallsend commemorates it. Portions of it still exist. The most stirring historical events associated with the shire are the battles of Otterburn (1388), Homildon Hill (1402), and Flodden (1513). Alnwick Castle, the seat of the Duke of Northumberland, and Ford Castle are among the grander structures in the county, but the ruined castles of Bamburgh and Norham yield to none in point of interest. Distinguished Northumbrians include Thomas Bewick, George Stephenson, the martyr-bishop Ridley, and Grace Darling. Pop. (1901), 602,859.

Northumbria, the most northerly of the old English kingdoms, formed by the union of Bernicia and Deira through the conquest of the latter by Æthelric, king of Bernicia, about A.D. 590. The kingdom of Bernicia, which extended from the Tees to the Firth of Forth and was bounded on the W. by Strathclyde, had been founded by Ida about 547, whilst Deira, situated between the Tees and the Humber with Cumbria on its western side, owed its origin to Ælla (c. 560). The power of Northumbria increased under Edwin, Oswald, and Oswy, but declined with the advance of Mercia in the 8th century. It submitted to Wessex in 827, and became subject to the Northmen in 866.

North-West Frontier Province, a province of British India, constituted in 1901 and placed under a Chief Commissioner and Agent to the Viceroy. It was formed out of the district of Hazara, on the eastern side of the Indus (formerly part of the Punjab), and the districts of Peshawar, Kohat, Bannu, and Dera Ismail Khan on the western side of the river, and the Political Charges of Kuram, Mala Khand, Khyber, Tochi, Gomal, and

Shirani. It occupies an area of 16,466 square miles. The Province was constituted in order to provide more immediate control over the frontier tribes, some of whom, such as the Afridis, Orakzais, and Chitralis, when under the influence of fanaticism, have proved extremely troublesome. But with closer and more vigilant supervision a period has been put to the periodical outburst of border warfare among the races extending from Baluchistan to Chitral. The chief city is Peshawur (pop. 95,147). Pop. of the Province, mainly Mohammedan (1901), 2,125,480.

North-West Passage, THE. The project of finding a passage by sea round the northern extremity of the American continent seems to have seriously originated with Sir Humphrey Gilbert, though such a passage is marked on some earlier maps of a speculative character and a Mexican friar, named Urdarieta, claimed to have actually made it. It was successively attempted by Frobisher, Davis, Hudson, Baffin, and many more; but its discovery was reserved for Sir John Franklin, who did not live to announce the fact, and for Captain (afterwards Sir) Robert John Le Mesurier McClure (1807-1873), who, in October, 1850, passed through Prince of Wales Strait into Melville Sound, which communicates, through Banks Strait, with the Arctic Ocean and, through Barrow Strait, with the gulf of Boothia in one direction and Baffin Bay in another. McClure had to abandon his ship, the *Investigator*, in the ice, but returned safely to England in 1854.

North-Western Provinces, since 1901 the UNITED PROVINCES OF AGRA AND OUDH, a lieutenant-governorship of British India, bounded on the N. by the Himalaya and comprising a large part of the vast plain extending from the Punjab to Lower Bengal, and watered by the Ganges, the Gogra, the Jumna, and many other rivers. The soil is fertile, and produces immense crops of wheat. Rice, barley, pulse, tobacco, millet, indigo, cotton, sugar, opium, and oil-seeds are also widely grown. The district was formed in 1835, and since 1877 has included Oudh for all purposes excepting the management of its land and courts. Allahabad (pop. 172,032) is the administrative capital, and other important cities are Lucknow (264,049), Benares (209,331), Cawnpore (197,710), and Agra (188,022). The area of the United Provinces is 107,164 square miles (Agra, 83,198; Oudh, 23,966) and in 1901 the population was 47,691,782 (Agra, 34,858,705; Oudh, 12,833,077).

North-Western Territories, that part of Canada bounded on the E. by Labrador, on the S. by Quebec, Ontario, Manitoba, Saskatchewan, and Athabasca, on the W. by Yukon, and on the N. by the Arctic Ocean. In 1869, when the territory, formerly called Rupert Land, was purchased, for £300,000, by Canada from the Hudson Bay Company, it included Manitoba (constituted a province in 1870), Alberta (1905), and Saskatchewan (1905)—formed from Alberta, Athabasca, Assiniboia, and Saskatchewan—and Yukon (separate territory, 1898). It now consists of the districts of:—

Keewatin ...	516,571 sq. miles	... 9,800 pop.
Mackenzie ...	562,182 "	... 5,216 "
Ungava ...	354,961 "	... 5,113 "
Franklin ...	590,000 "	... ? "
2,023,714 "		20,129 "

The extent of this vast unorganised area is more definitely known than the amount of its population which, however, is in any case very sparse. Franklin comprises Baffin Land (230,000 sq. m.), Grinnell Land (86,000 sq. m.) and the other Arctic islands of British North America. The principal heights are spurs of the Rockies penetrating into the tract at the north-west, and the Reindeer or Caribou Mountains. The larger rivers are the Mackenzie (2,350 miles long, including the Peace), Athabasca (740), Liard (850), Back's (560), all flowing to the Arctic, and the Nelson (1,450) and Churchill (925) draining into Hudson Bay. The chief of many lakes are Great Bear Lake (11,200 sq. m.), and Great Slave Lake (9,770 sq. m.). In certain parts there are abundant forests of pine, birch, spruce, and larch. Trade is mostly concerned with lumbering, mining, fishing, and peltry.

Northwich, a town of Cheshire, England, on the Weaver, 18 miles E.N.E. of Chester. Salt mines have been worked since the times of the Britons and Romans, and the pumping of brine still forms the leading industry. There have been extensive subsidences in the town, and many houses have been bolted together and shored to prevent them from collapsing. Other industries include boat-building, rope- and sail-making, iron and brass founding, and tanning. Pop. (1901), 17,611.

Norton, ANDREWS, theologian, was born at Hingham, Massachusetts, United States, on December 31st, 1786, and educated at Harvard, where he occupied the chair of Sacred Literature from 1819 to 1830. He published *Reasons for not Believing the Doctrines of Trinitarians* (1833) and other works written from the Unitarian standpoint. He died at Newport, Rhode Island, on September 18th, 1853. His son, CHARLES ELIOT NORTON, was born at Cambridge, Massachusetts, on November 16th, 1827, and educated at Harvard. Beginning life as a commercial man, he made several trips to Europe and also visited India, afterwards turning his attention to literature. He was the friend of Carlyle, Emerson, J. Russell Lowell, G. W. Curtis, John Ruskin, and other distinguished men of letters. In 1853 he published *Considerations of Some Recent Social Theories* and, in 1860, *Notes of Travel and Study in Italy*. He also translated Dante's *Vita Nuova* and *Divina Commedia*, edited the *Letters of Thomas Carlyle* and those of J. R. Lowell, and from 1864 to 1868 was editor of the *North American Review*.

Norton, CAROLINE ELIZABETH SARAH, poetess, was born in London in 1808. She was granddaughter of Richard Brinsley Sheridan, and an extremely beautiful and precocious woman. In 1827 she contracted a most unhappy marriage with the Hon. George Chapple North. At least twice her

domestic affairs came before the public prominently—in 1836, when her husband sued for a divorce, with Lord Melbourne as co-respondent, and completely failed to establish any case, and in 1853, when husband and wife appeared in the county court about money matters. Mrs. Norton's literary career began in 1829 with her *Sorrows of Rosalie*, in which the Byronic note was struck somewhat heavily, and was continued with *The Undying One* (1830), *A Voice from the Factories* (1836), *The Dream and Other Poems* (1840), *The Child of the Islands* (1845), and *The Lady of Garaye* (1862). She was also the author of some novels—*Stuart of Dunclath* (1851), *Lost and Saved* (1863), and *Old Sir Douglas* (1867). Her husband dying in 1875, she married Sir William Stirling Maxwell, of Keir, in 1877 and died on June 15th in the same year. It has been asserted and denied that she was the heroine of George Meredith's novel, *Diana of the Crossways*.

Norway, a kingdom of Europe, occupying the western and extreme northern parts of the Scandinavian peninsula. It has a north-easterly and south-westerly trend, between 57° 59' and 71° 11' N., and 4° 30' and 31° 12' E., and is bounded by the Arctic Ocean on the N., the Atlantic on the W., the North Sea and Skager Rack on the S., and Sweden on the E., the most northerly province—Finnmark—extending north of Swedish and Russian Lapland. It has an area of 124,130 square miles, and is over 1,100 miles long, with an average width of 70 miles between 64° and 68° N., which increases to 280 miles at 61°. The length of the coast-line (excluding the fjords) is 3,000 miles.

Physical Features. The greater part of Norway is a rocky plateau composed for the most part of gneiss and mica-slate, with an elevation of 2,000 to 4,000 feet, the surface of which is broken by ridges and heights rising to 6,000 feet and upwards, and wide fissures which form valleys, lakes, and fjords. The Kjolen range (3,000 to 6,000 feet), which divides Norway from Sweden, runs nearly parallel to the coast from 63° to 69° N.; at that point a series of great "fjelds" (broad, lofty, and generally level tracts of tableland) branch off west-south-westwards (in the Dovre Fjeld), afterwards diverging to the south-west, and finally southwards in the Langfjeld and their continuations, so that their direction is still in the main the same as that of the coast-line. On the eastern border the Kjolen Mountains are continued southwards in a line of lower ranges. The "backbone" formed by the Kjolen Mountains in the north, and the great fjelds in the south, divides the country into three sections—the Nordenfjeldske, comprising the whole region north of the Dovre Fjeld; the Vestenfjeldske, extending west of the Langfjeld, and the plateau south of them to Lindesnæs (the Naze), the southern extremity of Norway; and the Søndenfjeldske or Østland, which lies south of the Dovre Fjeld and east of the Langfjeld. The whole of the west sea-border is fringed with groups of rocky islands (the Skager-nard), which render navigation difficult, whilst the channels between them and the mainland, as well as the numerous fjords which penetrate

into the interior of both, afford good anchorage. Finnmark, in the extreme north-east, is for the most part an undulating, desolate, and almost treeless plateau, 1,000 to 2,000 feet above the sea. From the North Cape to Bindals Fjord, in about lat. 65° , the shore is wild, rugged, and deeply indented with fjords, behind which tower precipitous mountains, rising in some places to a height of 3,300 feet or more. The Lofoden Islands (between lat. $67^{\circ} 30'$ and $69^{\circ} 30'$), separated from the mainland by West Fjord, which in some places is 60 miles broad, exhibit an endless variety of fantastic forms. The most interesting feature of the Kjölen Mountains on the Nordland frontier is



SKETCH MAP OF NORWAY AND SWEDEN.

the vast Sulitjelma snowfield, which has an elevation of 6,166 feet. The scenery of the wooded and agricultural districts in the neighbourhood of the town of Trondhjem is far less impressive. At the southern extremity of the province of Trondhjem is the Dovre Fjeld, a wide, dreary, undulating moorland with an average elevation of 3,600 feet, the highest point being Snehetta (7,610 feet), long believed to be the loftiest mountain in Norway. Jostedalshra, south-west of the Dovre Fjeld between Nord Fjord and Sogne Fjord, is one of the largest glaciers in Europe. It lies 4,000 to 5,400 feet above the sea, and covers from 500 to 600 square miles. Several ice-streams, amongst which the Lodal Glacier is the finest, flow down to a height of 165 feet, coming within five miles of the fjord. The Langfjeld includes several groups, the

most remarkable being the Jotun Fjeld, which was first explored in 1820. It has more than 100 peaks of over 6,000 feet, many with bare and almost perpendicular sides standing out in bold relief from the surrounding snow. Glaciers and névé fields spread on every side, and the depressions are for the most part filled with broad and deep lakes. The highest points in this field are Galdhøpiggen (8,397 feet), the loftiest mountain in Norway, and Glitretind (8,379 feet). The seaboard between Romsdalsfjord and Stavanger is on the whole the grandest and most romantic stretch of coast in Norway. It is intersected by spurs of the Dovre Fjeld and Langfjeld, between which lie deep, narrow, and winding fjords, sometimes extending over 100 miles inland, and sending out branching arms in all directions. At every turn cataracts and waterfalls rush precipitously down their rocky sides, often from a height of 3,000 or 4,000 feet. They sometimes terminate in narrow valleys, such as Romsdal, which run up into the interior at a somewhat higher elevation. The inner arms of the fjords are generally clothed with a rich growth of crops and other vegetation. Between Stavanger and Langesnes lie the fertile but tame lowlands of the Jæderen and Listerland. The Söndenfeldske differs wholly in character from the Norden- and Vestenfeldske. The broad valleys which slope south and south-east towards Christiania Fjord between rounded and pine-clad hills are the beds of impetuous torrents, which often expand into large lakes, the finest being Lake Mjøsen on the Laagen, about 60 miles long. The longest of these rivers is the Glommen (nearly 400 miles).

Climate. Owing to the influence of the Gulf Stream the winters in North and West Norway are comparatively mild. The sea on these coasts is seldom or never frozen, though this frequently occurs in Christiania Fjord and the Skager Rack. The cold is most severe at the places farthest inland, such as Røraas. The southern part of the west coast has an annual rainfall of 40 to 70 inches.

Population; Industries and Commerce; Communications. In 1900 Norway contained 2,240,032 inhabitants, or 18 to the square mile, the rural population numbering 1,612,382. This total included 19,677 Lapps and 7,777 Finns. The largest towns are Christiania (pop. 227,626), the capital, Bergen (72,251), Trondhjem (38,180), Stavanger (30,613), and Drammen (23,093). As 75 per cent. of the soil is incapable of cultivation, only 3 per cent. under cultivation, and 22 per cent. is covered with forests, the country cannot furnish sufficient food for the inhabitants, and large quantities are imported. Over 20,000 persons emigrate annually, and those who remain behind are fairly prosperous. The bulk of the agricultural population are small peasant proprietors. Potatoes are very extensively grown, even in the most northerly latitudes; peas are also an important product, and wheat, rye, barley, and oats thrive, barley ripening as far north as 70° . The pastures are situated on the fjelds, often 30 or 40 miles from the farm to which they belong. The pine forests, which are most dense in Östland, are far more profitable. They are usually

felled during the winter, and in the ensuing spring floated down the rivers to the saw mills at their mouths. The other great home industry of Norway is the fishing trade. The cod and herring fisheries are by far the most important, the number of persons engaged in them in 1900 being 75,999 and 27,782 respectively. Cod abound on the west coast, the season lasting from January to April, whilst herring are taken at all times of the year, but in summer especially. The mackerel, salmon, and lobster fisheries are also valuable, and in the northern seas the whale, walrus, seal, and shark are still successfully fished for. The principal minerals are silver, copper, and iron; but this branch of industry is not very important. Such manufactures as Norway possesses (including textile goods, machines, tobacco, and chemicals) are for the most part located in the neighbourhood of Christiania. Norway is actively engaged in the carrying trade, and possesses a large mercantile marine. The number of ships owned by Norwegians which entered her ports in 1905 was 7,320, with a tonnage of 1,451,425. The chief exports are fish-oil, and other animal produce; timber and wooden goods (among which lucifer matches form an important item); paper and paper manufactures; and skins, furs, and feathers. The leading imports are articles of food, especially breadstuffs, machinery of various kinds, minerals and metals unwrought and partly wrought, and textile manufactures. Great Britain and Germany are the countries with which Norway has the largest trade. In addition to numerous good roads, the internal communications of the country are carried on by means of 1,548 miles of railway and 10,830 miles of telegraph lines, the greater portion of both being State property.

Government; Army and Navy; Finance. The Norwegian constitution was formulated in 1814, and has since been frequently modified. The authority of the Sovereign is limited. He is assisted in his executive functions by a responsible council composed of one minister, together with at least seven councillors, at the head of as many departments. The members of the legislative body, which is called the Storting, are elected every three years by citizens of 25 years of age who reside, and have resided five years in the country. On meeting the Storting divides itself into the Lagthing, composed of one-fourth of the members, and the Odelsting, composed of the remaining three-fourths, which originates all Bills. If the two houses do not agree over any measure, its fate is decided by a two-thirds majority of the houses sitting in common. When in session the members of the Storting are paid 13s. 4d. each daily, in addition to travelling expenses. The King's power of veto expires when a Bill has been passed by three successive Storthings. He has no power of dissolving the Storting. For purposes of local administration, the six stifts or bishoprics—Christiania, Christiansand, Bergen, Hamar, Trondhjem, Tromsø—are divided into twenty districts—viz. the towns of Christiania and Bergen, and eighteen amts (counties or provinces), each of which is under the direction of an amtmand. The amts

are subdivided into fogdereier, and these again into herreds (rural communes). The army is composed of troops of the line, mainly raised by conscription, from which the three northern amts are exempt, the landværn (militia) and the landstorm (a reserve force consisting of all able-bodied males). The navy (which consists of four Tyne-built armour-clads, four monitors, four unarmoured gunboats, and a small torpedo fleet) is largely recruited by conscription from Nordland, Tromsø, and Finmark. The public revenue and expenditure may be said approximately to balance at a little over £5,000,000 a year, and the public debt is nearly £17,000,000.

Character of the People; Religion and Education. The Norwegians are a sturdy, thrifty, independent and, on the whole, moral people. The democratic feeling is strongest in the country districts. The people are mostly members of the Lutheran Church, which is the only established form of religion. Excepting Jesuits, all other Christian sects and Jews are tolerated. Education is free and compulsory between the ages of seven and fourteen. In addition to the public elementary schools, there are secondary schools and schools of higher grade in most towns, and the national university of Christiania is attended by about 1,500 students.

History. Up to the end of the 9th century the Norse branch of the Teutonic family was known to the outside world only through the expeditions of the Vikings, who about 787 began to devastate the shores of western Europe. The attempt of Halfdan the Black and his son, Harold Harfagr (Fairhair) (circa 850-930), to extend their sway from their native district of Vestfold over the whole of Norway, drove fresh swarms of the folk to seek new homes in other districts. The supremacy of Harold was acknowledged by the petty rulers—kings, jarls, or hersirs—as far north as Trondhjem, which he made the centre of his kingdom. Under Harold and his successors the people retained a large measure of the liberty which they had previously enjoyed, and at the "things," or public meetings, the kings were often reminded, forcibly enough, that there were limits beyond which they could not venture to go. The great "things," eventually four in number, were formed by uniting the assemblies of several fylkis (the old local divisions) so as to constitute larger aggregates. Of these early kings, whose story is graphically told in the pages of Snorri Sturluson, the Icelandic historian, the most famous were Olaf Trygvason, Olaf the Saint, and Harold Hardrada, one of the most romantic figures in mediæval history. On the death of Hakon (Haco) I., in 1319, the crown passed to his daughter's son, Magnus of Sweden, and by the Kalmar Act of Union, in 1380, the three northern realms were united under Margaret of Denmark. There follows a break of over 400 years in the history of Norway as an independent state, a period during which she lost her ancient colonies of Orkney and Shetland, which were given in pledge to Scotland in 1468 and never redeemed. In 1814 she transferred her allegiance at the bidding of the Congress of Vienna (with great reluct-

ance and after preparation for armed resistance) from Denmark to Charles XIII. of Sweden, receiving at the same time a constitution of her own. The change, however, never received the popular sanction and, towards the close of the 19th century, the sentiment in favour of separation from Sweden acquired overwhelming strength. In 1899 Norway adopted a separate flag and, on October 26th, 1905, the instrument peaceably repealing the union between the two Scandinavian states was formally signed. The throne was offered to a prince of the reigning house of Sweden, but declined and, after a people's vote, Prince Charles of Denmark, son of Frederick VIII., was elected King of Norway by the Storting on November 18th, 1905. He had married Princess Maud, third daughter of Edward VII., King of Great Britain, on July 22nd, 1896, and their majesties were crowned, amidst popular rejoicings, at Trondhjem on June 22nd, 1906. He adopted the style of Hakon VII.

Literature. The ancient period of Norwegian literature was that of the immortal tales, legends, and traditions comprehensively known as the Sagas. Later writers are usually grouped with the Dunes. But the recovery of independence in 1814 was speedily followed by the growth of a national literature. Wergeland (1808-45) and Welhaven (1807-73) were the chief writers of fiction during the earlier period. Among later novelists the best known are Jonas Lie (b. 1833), Kjelland (b. 1829), and Bjørnstjerne Bjørnson (b. 1832). The dramas of Henrik Ibsen (1828-1906) depict the evils of the existing state of society with a tragic force which has spread their author's fame throughout the world. Bjørnson also, who formerly delighted readers by his idyllic tales of country life, became the preacher of a new social gospel. The names of the mathematician Abel (1802-29), the zoologist Sars (1805-69), the orientalist Lassen (1800-76), the historian Munch (1810-63), and the theologian and philosopher Bugge (b. 1838), are all distinguished in their various spheres. Norway has produced several eminent musicians, including the violinist Ole Bull (1810-80) and the composer Edvard Grieg (b. 1843). Tidenmand (1814-76) may be taken to be her representative painter and Middlethun (1820-86) her sculptor. In travel and exploration she knows no greater name than that of Fridtjof Nansen (b. 1861), who became, under the new *regime*, her first Minister in London.

Norwich, a cathedral city and the county town of Norfolk, England, on the Wensum, 20 miles W. of Yarmouth and 114 miles N.E. of London. The city is ancient and picturesque, with no main thoroughfare, the narrow and rambling streets converging towards the market-place. It is believed to have been the British *Caer Gwent* and the Roman *Venta Icenorum*. Its chief glory is the cathedral, which was founded in 1096 by Bishop Herbert Losinga, and retains most of its original Norman features. The west front, nave, and aisles were altered in the Perpendicular period, and to the latter style belong also the magnificent vault with bosses representing scenes in Scripture history, the clerestory and vault of the presbytery,

and the choir-stalls. The cathedral is 407 feet long and 72 feet broad, the length of the transept being 178 feet. The united height of the Norman tower and Decorated spire is 315 feet. The cloisters, Perpendicular in style, are exceptionally beautiful. Of the castle the only remaining part is the massive Norman keep, 70 feet high, and about 90 feet square; along with adjacent buildings, it had been used as a gaol, but in 1894 was transformed into a picture gallery and museum. Of the city's many churches the most noteworthy are



NORWICH CATHEDRAL.

(Phot. Valentine & Sons, Dundee.)

those of St. Peter Mancroft and St. Andrew. St. Andrew's Hall, in which are held the triennial musical festivals, was originally the nave of the Black Friars' church, rebuilt about 1450. There are many other relics of the Middle Ages, including the Guildhall (1408-13), the old Bridewell (*circa* 1370), the grammar-school (*circa* 1316), and two gateways. St. Ethelbert's (1275) and the Erpingham Gate (1420), leading to the cathedral precincts. Modern structures include the Roman Catholic Cathedral of St. John the Baptist, the prison on Mousehold Hill, the Jenny Lind Infirmary for Sick Children, the Technical Institute and School of Science and Art, the Norfolk and Norwich Library, and the Blind Asylum. Mousehold Heath belongs to the city and Chapel Field Gardens and Castle Gardens are public recreation grounds. Norwich was at one time the chief seat of the worsted manufacture, which was introduced from Flanders in the 14th century, and crapes, camlets, and other textile

fabrics are still manufactured; but the principal industries are now boot- and shoe-making, iron-working, and the manufacture of starch and mustard. There are factories for oil-cake and agricultural implements. The Nursery Gardens are extensive, and the Cattle Markets of first-rate importance. The city was sacked by the Danes repeatedly and burned by Sweyn in 1004. It received its first charter in 1194, lost half its population by the Black Death in 1349, and witnessed the gathering of Ket and his rebels on Mousehold Heath in 1549. Pop. (1901), 111,728.

Nose. The outer part of the nose consists of a framework of bone and cartilage with certain muscles lying beneath the integument. The two orifices are termed the anterior nares. On tracing backwards the spaces into which these orifices lead, they are found to pass into what are known as the nasal fossæ. These two fossæ are separated one from another by a median partition, the septum of the nose, while their outer walls are formed by three bones which are called the turbinate, spongy bones. These bones project from without inwards, arching over, and, though they do not extend to the middle line, they practically divide each nasal fossa into three parts, which are known as the superior, middle, and inferior meatuses. Posteriorly, each nasal fossa communicates with the pharynx by an aperture, these apertures being known as the posterior nares. The bony framework of the nasal fossæ is lined by a mucous membrane, the pituitary or Schneiderian membrane. The epithelial lining of this membrane presents different characters in different parts. In the lower part the epithelial cells are ciliated and, as it is through this part that the currents of air mainly pass in ordinary breathing, it is termed the respiratory region. The upper portion of the Schneiderian membrane is known as the olfactory portion. The epithelium here is non-ciliated, and there are in this situation peculiar cells, presumably connected with the terminal fibrils of the olfactory nerve. The ultimate filaments of this nerve are distributed over the upper third of the septum and the roof of the nasal fossa, and extend to the surface of the superior turbinate bone and in part to the middle turbinate bone.

Nostoc, a genus of blue-green Algae, the type of the order Nostocaceæ and of the sub-class Nostochineæ. Of the numerous species a few swim freely in fresh or brackish water; but most are terrestrial, growing on wet rocks or even on comparatively dry soil or within the tissues of other plants, such as the Rhizocarp Azolla, Anthoceros and other Hepaticæ and duckweed. In most species one or more interwoven filaments, made up of minute round cells, are enclosed in a gelatinous mass, which is known as the thallus or frond, and is formed by the coalescence of sheaths originally enclosing each filament. The masses are green, blue, or violet, hardened externally in the terrestrial species, and sometimes an inch or more across. *Nostoc commune*, appearing on gravel walks, after a shower, where it was unnoticed before, is sometimes known as "fallen stars," "spittle of the stars," and "witches'

butter." Some species are edible. In China *Nostoc edule* is a favourite ingredient of soup.

Nostradamus, the name assumed by MICHEL DE NOTREDAME, a French astrologer of Jewish descent, who was born at St. Remy, in Provence, on December 14th, 1503. After taking the degree of doctor of medicine at Montpellier (1529), he practised in various French towns, finally settling at Salon, near Aix (1544). He signalled himself by his devotion to sufferers from the plague at Lyons. The first edition of his famous *Centuries*, a collection of rhymed quatrains expressing various predictions mostly couched in vague and obscure terms, was published in 1555. He became royal physician on the accession of Charles IX. Nostradamus died at Salon on July 2nd, 1566.

Notables, literally the most notable or important men in a state. In France, where alone the term was used, it meant the members of an extraordinary board of deputies, who were appointed and convoked by the sovereign, and particularly by those kings who ruled arbitrarily and aimed at dispensing with the sanction of the States General. The convening of an Assembly of the Notables thus afforded an appearance of *quasi*-legality, though it was in itself an illegal instrument. The first important assembly was held in 1558, but the two most remarkable were those in 1787 and 1788, which were summoned by Louis XVI. in view of the crisis then at hand. The assembly of 1787 consisted of 144 persons, mostly nobles and divines.

Notary Public, originally a person of competent penmanship who made notes of acts for other persons who wished to keep evidence of them. Afterwards the term described a law officer or other functionary who made a profession of witnessing acts, deeds and contracts, and of issuing a certificate to that effect. This certificate was usually accepted as evidence of the act performed in the testifier's presence, and witnessed to by him, though the Courts were not bound to admit it. Therefore in England the duties of notary public are commonly undertaken by solicitors. The office is more frequently met with in Scotland, where notarial acts and certificates have always been more generally employed. The English custom, however, is coming more into vogue.

Notation may be said to be the use of definite symbols for the representation of definite things. Although symbols are of great importance in chemistry, music, and mathematics, yet here we need only deal with those commonly used in counting. It must have always been necessary to have some means of representing quantity, and so we find that in the very earliest times—long before the growth of writing—certain signs were used to denote numbers. It was natural that the fingers should first be enlisted as symbols, and counting by these appendages in the course of time developed into an intricate system of reckoning. In its primitive form it is found now among certain savage tribes, and it is remarkable to note that savages, as a rule, can only deal with very small

numbers. Elaborated to a finished system of calculation, it is seen in certain provincial villages in Europe itself, where the different positions of the fingers—obtained by bending or closing them—are capable of expressing numbers up to 10,000. The fingers, however, though useful for expression, were useless for record, and so a system for expressing numbers by strokes grew up. This was obviously cumbersome for large numbers, and soon different symbols were employed to stand for such numbers as 5, 10, 100, etc. The Babylonians represented all numbers below 100 by two symbols only—for 1 and 10—these being repeated as many times as the number required; larger numbers were, in fact, obtained simply by the addition of smaller ones. Soon, however, multiplication began to be used. In the Syrian system (derived from the Egyptian), as well as in the Babylonian, a sign put to the left of the symbol for 100 denoted the number of hundreds meant. As writing grew general, the alphabet became a field for symbols. Sometimes the letters taken in order represented the numbers also in order, as in the Ionic system; and sometimes the initial letter of the word signifying the number was used to denote it, as in the "Herodian" system of the early Greeks. Later the Greeks, like the Hebrews, took certain of their letters to denote the numbers from 1 to 9; others represented 10, 20, 30, and so on, while further letters were used to signify the hundreds. The Roman system is familiar to all. Before the letters "C" and "M" (the initials of *centum* and *mille*) were used, however, we find a circle divided in different ways representing 100 and 1,000. The sign Φ for 1,000 may have given rise to the form (I), and half the sign would be D, the symbol for 500. Some people think that "M" itself comes from the old sign and not from *mille*. The sign Θ for 100 may also have given rise to \perp or L for 50. It gradually became evident to the Greeks and Hebrews that high numbers could be expressed by merely altering the position of the symbols of the lower ones, and from this time onwards notation assumed an easy form. For a long time numbers had been mechanically represented by means of counters placed on a kind of table known as an abacus. The use of an abacus with nine ciphers instead of the counters seems to have been known in Europe in the 10th century, before the complete modern system was introduced. This complete system came into use in the 12th century, and differed from all previous ones in having the sign 0. Until then no zero had been used, so it was not always clear whether a symbol meant a certain number or ten or a hundred times as much. The system with the zero seems to have originated in India, to have taken root in Arabia in the 9th century, and from thence to have entered Europe. Besides this decimal system, we still have a trace of a sexagesimal system in the division of time and in the graduation of the circle. This method was in use among the Babylonians, who reckoned in powers of 60.

Notochord, the cartilaginous rod which lies under the main nervous system and is the primitive

element of the skeleton in the phylum of animals known as the Chordata. It extends typically from one end of the body to the other as a cylindrical rod tapering to a point in either direction; as such it occurs in the remarkable *Amphioxus* or Lancelet. In the *Ascidians* or *Tunicates* it is restricted to a short mass underlying the nerve cord in the caudal or tail section of the body. In the *Vertebrata*, on the other hand, the skeleton is developed and encroaches upon the continuity of the notochord; it completely atrophies in the skull except in the sturgeon and the lampreys. It may persist as a series of soft disconnected masses between the bones of the backbone or vertebral column, as in fishes, or may be entirely lost. The Chordata form a phylum of the animal kingdom based upon this structure; it is divided into three sub-phyla: (1) the *Urochordata*, including the *Ascidians*, in which the notochord is restricted to the caudal section; (2) the *Cephalochordata*, comprising only *Amphioxus*, in which it extends throughout the body; and (3) the *Vertebrata*, including the fishes, reptiles, amphibians, birds, and mammals in which the notochord is lost wholly or in part, owing to the development of a body skeleton. A structure in *Balanoglossus* has been identified as a notochord, and this group of worms was therefore included among the Chordata; this view, however, is not now accepted.

Notogaea, Huxley's southern zoological division of the land surface of the globe, corresponding to Selater's Neotropical and Australian regions. [ARCTOGÆA.]

Notornis, a genus of large flightless rails, with one species from New Zealand. It probably became extinct within the last half of the 19th century.

Notoryctes, a mole-like marsupial (*Notoryctes typhlops*) from Australia, forming a family (*Notoryctidae*) of polyprotodont marsupials. It was described by Professor Stirling in 1891 and by Dr. Hans Gadow. (*Proceedings of the Zoological Society*, 1892, pp. 361-70.)

Not Proven, a verdict, recognised in Scots law, returnable by the jury in a criminal action when the evidence is not conclusive enough to establish guilt and yet sufficiently strong to warrant suspicion. Under such a verdict the charge is not finally disposed of. Should the prosecution obtain additional evidence, a fresh trial may be ordered. In some cases the result of such a verdict has been humorously expressed in the familiar phrase, "Not guilty, but don't do it again." The fact that the verdict has failed to find a place in the legal procedure of other countries has led many to doubt its value; but it seems reasonable to suppose, on the other hand, that it would not be retained in Scots practice were its equity and usefulness open to serious question.

Nottingham, the capital of Nottinghamshire, England, on the Trent, 15 miles E. of Derby and 126 N.W. of London by railway. Originally a Roman settlement, it became the Mercian Snotingaham or "home of the Snotings." During the

reigns of Ethelred I. and his successors it was frequently occupied by the Danes, who were finally expelled in 940. Here Charles I. raised his standard at the beginning of the Civil War (1642), and the town was the scene of Luddite and other riots between 1795 and 1816. In modern times the progress of the lace and hosiery manufactures has given Nottingham a leading position amongst commercial towns. Other industries include the making of cycles and motor cars, iron-founding, chemicals, needles, baskets, and beer. At University College (1879-81) instruction is given in connection with the University Extension scheme; the building also includes a free library and a natural history

by a fine bridge. On the right, or southern, bank of the river is the famous cricket-ground of the Notts County Club, and also the pitches where Notts County and Notts Forest hold their football matches. Golf links, too, have been laid out. Anglers swear by Nottingham worms, which seem to find in the soil nutriment that renders them irresistible. Nottingham float-tackle is also in high esteem for chub and other fishes. Pop. (1901), 239,753.

Nottinghamshire, or NOTTS, a north-midland county of England, bounded on the N. and N.W. by Yorkshire, on the E. by Lincolnshire, on



NOTTINGHAM CASTLE.

[Photo : Frith & Co., Reigate.]

museum. The cruciform church of St. Mary is a fine specimen of Perpendicular architecture. The grammar-school, founded 1513, was reorganised as a high school in 1882. Nottingham possesses the largest market-place in England (5½ acres). The arboretum (17 acres) forms an attractive pleasure-ground. Nottingham Castle occupies the summit of a precipitous sandstone cliff (honey-combed in parts with caves) overlooking the Trent; the original Norman fortress was, in 1674, replaced by the mansion in classical style of William Cavendish, first Duke of Newcastle, much injured by fire during the Reform riots 1831, restored in 1878, and now used as the municipal museum and art-gallery. Other buildings are the Exchange, Guildhall, the County Hall, and the Roman Catholic Cathedral. The Trent, here 209 yards wide, has been spanned

the W. by Derbyshire, and on the S.E. and S. by Leicestershire. It has an area of 824 square miles. It is 50 miles long from N. to S., with an extreme breadth of 25 miles. The Trent enters the county from Derbyshire near the south-western extremity, and flows north-east, and then north into Lincolnshire; its principal tributaries are the Soar, Erewash, and Idle. The eastern part of the county, comprising the valley of the Trent and the Vale of Belvoir, is flat, and at the northern extremity is the Mission Level or Car, which up to 1796 was a swamp. In the south of Nottingham are the wolds, consisting of moorland and grassy uplands. Elsewhere the surface is undulating and well wooded, especially in the west, which includes a great part of Sherwood Forest, which both by tradition and in ballad was the scene of many of the exploits of

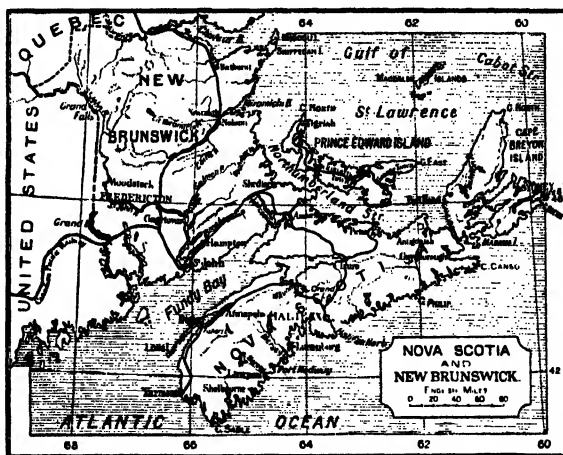
the bold outlaw, Robin Hood. The Nottingham and Grantham and Fosse Dyke Canals afford communication between the Trent and the Witham. The geological formation consists of Old Red Sandstone and magnesian limestone, with a substratum of coal in the west; in other parts are quartz, gravel, marl, lias, and New Red Sandstone. The soil is, on the whole, not very productive. Corn and green crops are grown extensively, and there are many market-gardens and orchards. There are numerous coal-mines. Leading industries are hosiery and lace manufactures. Among natives of the shire may be named Archbishop Cranmer, Colonel Ireton, Paul Sandby and R. P. Bonington, the artists, Henry Kirke White and Philip James Bailey, the poets, and General Booth, the founder of the Salvation Army. Pop. (1901), 514,537.

Novalis, the pseudonym of FRIEDRICH LEOPOLD VON HARDENBERG, one of the founders of the German romantic school, who was born at Wiederschiedt, near Mansfeld, in Prussian Saxony, on May 2nd, 1772. At the university of Jena, which he entered in 1790, he came under the influence of Fichte, and formed an enduring friendship with Friedrich Schlegel. After residing at Arnstadt and Weissenfels he settled in Freiberg to study mineralogy, but he died of acute consumption at Weissenfels on March 25th, 1801. Among the friends of his later life were A. W. Schlegel and Tieck, the latter of whom edited his works in conjunction with Fr. Schlegel. His philosophical romances *Heinrich von Ofterdingen* and *Lehrlinge zu Sais* show a deep sense of the beauty and mystery of the universe and a conviction that moral truth is known by immediate intuition and not through any intellectual process. He also wrote *Hymnen an die Nacht*, inspired by Sophie von Kühn, his betrothed, whose premature death greatly affected him.

Novara, capital of the province of Novara, Piedmont, Italy, between the Angogna and Terdoppio, 31 miles W. of Milan. The fortifications have been demolished and converted into promenades affording grand views of the Alps. The chief buildings are the Romanesque Cathedral, the church of San Gaudenzio, the Antiquarian Museum, and the Technical Institute. The industries include silk-spinning, textiles, iron-founding, organ-building, dyeing, and printing. Novara was the scene of the overwhelming defeat of the Sardinians, under Charles Albert, by the Austrians, under Radetsky, on March 23rd, 1849. Pop. (1901), 19,557.

Nova Scotia, a province of the Dominion of Canada, between 43° 25' and 47° N. and 59° 40' and 66° 25' W., comprising the peninsula of Nova Scotia and the island of Cape Breton, which is separated from the north-eastern coast of Nova Scotia by the narrow strait of Canso. Its total area occupies about 21,068 square miles. The

peninsula is 250 miles long from N.E. to S.W., with an extreme breadth of 100 miles, and is connected with New Brunswick at its north-western extremity by an isthmus about 16 miles in width. The other boundaries of the peninsula are Northumberland Strait, which separates it from Prince Edward Island, on the N., the Bay of Fundy on the W., the strait or "gut" of Canso on the N.E., and the Atlantic on the E. and S. The lakes, with the rivers flowing from them, which seldom exceed 50 miles in length, cover about 3,000 square miles. The largest, Lake Rossignol, in the southern part of the peninsula, is over 20 miles long. Great Bras d'Or Lake (500 square miles) in Cape Breton is a lake only in name, since it communicates with the sea through Little Bras d'Or Lake. The chief rivers are the Shubenacadie, Avon, and Annapolis, flowing into Fundy Bay, and the St. Mary, Musquodoboit, Lahave, and Liverpool draining into the Atlantic. There are several ranges of lofty hills, which for the most part run parallel with the coast; the highest points (1,100 to 1,200 feet) are in the Cobequid Mountains, near the New Brunswick border on the northern side of Minas Basin, an arm of the Bay of Fundy. The coast is much indented, especially on the S.E., where there are many fine harbours, such as that of Halifax, and Mahone and Margaret's bays. A vast collection of small islands runs along the whole of the Atlantic seaboard. Sable Island, a long narrow stretch of sand at the southern extremity, has been the scene of many shipwrecks. The climate is, on the whole, temperate, and the province is remark-



SKETCH MAP OF NOVA SCOTIA AND NEW BRUNSWICK.

ably fertile, the best soil being that of the broad valleys between the hill ranges. There is also a rich tract along the shores of Minas Basin due to the marine deposits which remain after the "bore," when the tide sometimes rises 60 or 70 feet. The principal crops are oats, maize, barley, buckwheat, potatoes, turnips, and hay, and garden fruits,

especially apples, are extensively cultivated. In the valley of the Annapolis orchards extend along the roadside for over 50 miles. Dairy produce is of increasing importance and live-stock are raised in fair numbers. At the Government Agricultural College near Truro are taught farming and household management to students of both sexes. There are extensive coalfields in Cape Breton and the northern part of the peninsula, and gold and iron are also worked. The fisheries are second only to those of Newfoundland, and comprise salmon, cod, halibut, haddock, mackerel, herring, and lobsters. The manufactures include paper-pulp, tweeds, flannel, carpets, blankets, linen, leather, boots and shoes, agricultural implements, and railway carriages, besides shipbuilding and the iron and steel industries. The provincial government is administered by a Lieutenant-Governor, assisted by an Executive Council. There are a Legislative Assembly of 38 members, elected at intervals of four years, and a Legislative Council of 21 members. The province sends 10 senators to the Upper and 18 members to the Lower House of the Dominion Parliament. The larger towns are Halifax (pop. 40,832), the capital, Sydney (9,900), Glace Bay (6,945), Yarmouth (6,430), Truro (5,993), and Springhill (5,178). Nova Scotia was discovered by the Cabots in 1497. The French, however, first settled the country (which they named Acadie) in 1604, but the British persisted in their claim by priority of discovery, and the Treaty of Utrecht (1713) finally ceded the country to Great Britain. Before this, Sir William Alexander, Earl of Stirling, had obtained a grant of the territory from James VI., the land being then known as New Scotland or Nova Scotia. In the reign of Charles I. the first of the Nova Scotia baronets were created, the title being sold for £150, on the condition that the grantee assisted in developing the country. The forcible dispersal of the Acadians, descendants of the original French colonists, in 1755 supplied Longfellow with some of the materials for *Evangeline*. The French clung desperately to Cape Breton, which was annexed to Nova Scotia in 1763, was made a separate colony in 1784, and re-united to Nova Scotia in 1819. New Brunswick was detached in 1784. Pop. (1901), 459,574.

Novatian (b. *circa* 200), the first anti-Pope, was a heresiarch who had adopted the ultra-ascetic opinions associated with Montanus who, in the 2nd century, advocated the return of believers to the stricter discipline of the first Christian Church. The place of Novatian's birth is unknown. He was converted from paganism after a severe mental conflict, and ordained priest by Fabian, Bishop of Rome. During the Decian persecution he opposed the readmission of the lapsed into the Church, and was led by the difference of their views on this question to oppose Cornelius, Fabian's successor (251). He was himself consecrated Bishop of Rome by some of the party who seceded with him and who became known as Novatians, though the title they gave themselves was Cathari ("the pure"). This sect gradually died out at the close of the 6th or the beginning of the 7th century.

Nova Zembla (Russian, *Noraya Zemlya*, "New Land"), two islands in the Arctic Ocean, belonging to Russia, between the Kara Sea on the east and Barents Sea on the west. Their united length is 600 miles and their average width 60 miles, while they have an area of some 35,000 square miles; they are of nearly the same size, and are separated by a narrow channel called the Matotchkin Shar. On the south, Kara Strait, 30 miles wide, divides them from the island of Vaigatch, which, in turn, is separated from the mainland by Yugor Strait. The islands are a disrupted prolongation of the Ural Mountains. The ice on their western side is in large measure dispersed by a current which flows on in continuation of the Gulf Stream, striking Nova Zembla on the north-west. The interior is wild and desolate, and rises to heights of 4,000 feet, and there are some small glaciers. The coasts abound with seals, sea fowl, and fishes, and whales and walrus also occur. The moss, stunted herbage, and grass provide food for the reindeer, and among other animals the polar bear, Arctic fox, ermine, wolf, and lemming are found. There are no settled inhabitants, but a permanent Russian fishing station was established about 1877. The islands form a dependency of the government of Archangel, and the population, mostly Samoyedes, does not exceed 100.

Novel (Italian, *Novello*) is the term used to describe pithy and unusual tales of incident which came into vogue in Italy after the popularity of Boccaccio's *Decameron*. The *Novelles* of Queen Marguerite and of Cervantes were, in reality, merely romances in small compass and, though their form was original, they were practically offshoots of ancestors in the remote East—the Chinese dramas and the Arabian fables. It is impossible to trace minutely the process of evolution from the Oriental hothouse of the passions, through the classics of Greece and Rome, to Italy and Spain, and on to the days of Elizabeth, when the novel—as we now understand it—came into being. To explain the growing effect of civilisation on the thought-region of man, and the gradual expansion of his ideals as they travelled from East to West, it would be necessary to hark back to the time when the ancients recited in minor cadence to the psalter, and pass on, by way of many archaic legends and fables, to the tales of *The Thousand and One Nights*, that were representations of the lively and fantastic imaginings of those whose poetic efforts were directed first by fancy, and afterwards by observation and memory and, later, amplified by reason.

Simpler is it to deal with poetic thought as it budded in Europe and found expression in the primitive Romance tongue of the Troubadours, in the early Icelandic Sagas, and the songs of the Minnesingers or German bards, till at last Chaucer—in the reign of Edward III.—embodied the exquisite characteristics of both Gothic and Romance tongues and created a language which has been described as "the most valuable vehicle of human thought ever invented." To the old bards music seemed to be the natural outcome of

poetic recitation. They accompanied themselves with psaltery, with lyre, or with vielle, just sufficiently to accentuate the rhythm of the Romance or unlettered tongue, and create an atmosphere suited to the theme. Early strings were few, but they served, for the narrations were not complex. They touched laughter. They touched tears. They caught hold of the hearts of men and led them to laughter or to death.

In the Middle Ages the fancy of the people was easily inflamed by tales of heroism gathered from fact and embroidered by fantasy—chivalric tales of Gothic, Frank, and Burgundian heroes. Great deeds were sung in the legends of Charlemagne, of Roland, of King Arthur and the Knights of the Round Table, till the popular mind travelled on the crest of a romantic wave that finally carried it towards a new tide of religious enthusiasm, and thus, in the 12th century, reached a climax of blended beauty in the allegory of the Holy Grail.

But it was not till the reign of King Edward IV. that the talented Welshman, Sir Thomas Malory, with true artistic touch, gathered together the Arthurian legends into the refined literary whole known as *Le Morte D'Arthur*. This book, which was admittedly compiled from French sources, was printed in 1485, and will ever remain memorable as the first milestone on the road to prose fiction. By its side must be placed the fine contributions to romance literature of Lord Berners. His story of *Huon of Bordeaux*—published in 1534—deals with the Charlemagne cycle, and is notable, firstly, for the choice, vigorous, and noble style of the narrative and, secondly, for the introduction of Oberon, the fairy king, who reappears in *Midsummer Night's Dream*.

Meanwhile, the influence of Italy was making itself felt in England. The lively imagination, the warmth, the tenderness of Boccaccio, the grandeur of Dante, the softening splendour of Petrarch, and the harmonious notes of Tasso, were serving to prepare the literary way for the development of the great Elizabethans—Shakespeare, Spenser, Ben Jonson, and others—who all, more or less, gave evidence in their work of their appreciation of Italian thought. This taste, shared by the people, begot something like scorn for the old romances of chivalry that had hitherto obtained so great an empire over the reading mind. Not in England alone was the revolution perceptible. In Spain the chivalric vein had been worked to death, and a courtier of Charles V. relates how men fed their brains on extravagant books such as *Amadis de Gaula*, *Primateon*, and the like, till, in 1553, they were prohibited from being printed or sold in the American Colonies and, two years later, the Cortes demanded that the prohibition should extend to Spain. England at this period was given over to translators and adapters, among whom was Painter, whose work during the 16th century acted as a species of reservoir for the plot-seeking dramatists who were to follow. Not only were his translations valuable in the creation of Elizabethan drama, but, in a sense, they afforded nutriment for what is called the Elizabethan novel.

In 1579, *Euphues, the Anatomy of Wit*, by John

Lyly, was published, and at once tickled the fancy of the courtiers, and though its triumph was short-lived, it set novel-writing on a firm footing. The style has been ridiculed on account of its artificiality, but the very attention it received was a certain sign of its attraction for the literary world of the day and, despite sharp criticism, it secured the sincere flattery of imitation for some centuries. Following Lyly were three romancers. These were notable for originality, wit, strength, and grace. The first was Sir Philip Sydney, whose pastoral prose-poem *Arcadia* (1590) has been described as a sort of "halfway house" between the old chivalrous tales and the so-called heroic romances of the 17th century. The charm of this work lay not so much in great ingenuity of plot as in the sentiment of the theme, for men were growing weary of action and adventure, and the taste of Europe was taking a turn that became a direct movement when Miguel Cervantes, in 1605, published the first part of *Don Quixote*. This immortal "History of the Knight of the Sorrowful Countenance and his faithful Squire Sancho Panza" struck a death-blow at the fanaticism for extravagant chivalry that had hitherto dominated Spanish literature and spread its contagion throughout Europe. Some declare that it had the unfortunate effect of killing the good with the bad, though others argue, and Professor Raleigh is one of them, that Cervantes found the romances rapidly passing away and, loving them, "put forth his hand just in time to save as much of the perishable stuff of which they were composed as he could put to new and lasting uses." It was the rise of the literature of Greece and Rome, he avers, that was responsible for the death of the old romance. Be this as it may, the novel of sentiment came into favour with Sydney's *Arcadia*, while the novel of unvarnished fact, with its vivid pictures of the actual and its truthful local colour, owes its being to Robert Greene. About the same time Thomas Lodge wrote *Rosalynde* (1590), a pastoral tale, full of idyllic beauty—which influenced the form of Shakespeare's *As You Like It*—and Thomas Nash produced, in 1594, the first example of the picturesque novel—the tale artistically drawn from life and pointed at life.

In the 17th century invention was influenced by France, and the vogue for heroic romances grew apace. After the suppression of stage-playing and players by the English Parliament in 1642, literary effort languished, but in 1692 William Congreve displayed his skill and humour in his first novel *Incongnita*. Women, too, began to wield the pen, and certain "scribblers," as they were called, became famous. The works of Mrs. Aphra Behn, published in 1698, displayed considerable originality and freedom of manner, and these were followed in the 18th century by Sarah Fielding's *David Simple* (1744), and Miss Charlotte Lennox's *The Female Quixote* (1752). Meanwhile John Bunyan's *Pilgrim's Progress* had infused the spirit of sincerity into work, and Daniel Defoe, whose youth had been impregnated with the religious arguments of the period, delighted both the literary and the unsophisticated with *Robinson Crusoe* (1715). This book, with its com-

mingling of the matter of fact and the moral with adventure, still holds first rank in the boys' library. As may be imagined, the remarkable contrast between the style of the rigid Puritans Bunyan and Baxter, and the witty and frivolous cavaliers Congreve and Wycherley, was not without its effect on the literature of the future. Unintentionally, on the principle of natural selection which secures the survival of the fittest, mind effected compromise with mind, and the literary issue grew hale and wholesome. It needed some decades, however, to secure a flourishing growth. In 1740 appeared Samuel Richardson's *Pamela*, which may be called the parent of the modern novel. It interwove reality and moral sentiment, and displayed its author's intimate knowledge of the human heart, particularly in its feminine ramifications. Richardson's masterpiece *Clarissa Harlowe*, and also *Sir Charles Grandison*, gained many admirers both in England and abroad, though they aroused the fierce antagonism of a contemporary, Henry Fielding. Till the appearance of *Pamela* Fielding had confined his attention to dramatic work, but he now conceived it his literary duty to tilt against what he viewed as the ethical and didactic affectations of the book. He was an adorer of nature and a master of satire, and he set out to war against pharisaical righteousness by casting lightning flashes of humour on shams of every kind. *The History of Tom Jones, a Foundling* (1749) is the tale of youth plus blood and muscle, and deals with nature in absolutely candid mood. "Who touches this touches a man," has been said of the book by its friends. Its enemies have styled it the corrupter of innocent minds. Level-headed critics accept it as a faithful piece of portraiture, touched in by the inspiration of a master.

Besides the works of the above artists were those of Tobias Smollett (*Roderick Random*, 1748), of Laurence Sterne (*Tristram Shandy*, 1759), and of Oliver Goldsmith (*The Vicar of Wakefield*, 1776). These, each in a different way, lent romantic assistance towards the evolution of the novel, and the making of the wondrous 19th-century Master—Sir Walter Scott. On this writer's novels it is needless to enlarge. They are ever present and all have heard of the thrilling effect produced when *Waverley* (1814) first electrified Europe with its convincing, chivalrous, picturesque romance. It was the Renaissance of Wonder indeed. As a literary incendiary Scott differed from his forerunners; these dealt with the fires that consume, he with the fires that cleanse. Thus a new and purified era began, and the sentiment of the movement was sustained by Charles Dickens (1812-70) and William Makepeace Thackeray (1811-63), whose works still live, and by Bulwer Lytton (Lord Lytton, 1803-73) and Benjamin Disraeli (Lord Beaconsfield, 1804-81), whose romances, though fascinating, are somewhat out of date. Four great names then came to the front to adorn and influence the last half of the 19th century. George Meredith (b. 1828) invented plots conscatting with brilliant intellectuality, Thomas Hardy

(b. 1840) introduced the poetical phases of realism, Robert Louis Stevenson (1850-94) caught the buoyant and breezy mood of youth at its zenith, and Rudyard Kipling (1865) trod a robust path entirely his own, discovering plain tales of India in what may be called a series of literary snapshots, remarkable for their accuracy and their genius for perspective. These are the voices of modern fiction; they represent the magnificent "liars" of the time, though many other writers have been and are justly noted for an inventive facility that is as captivating as it is clever. In a review published in 1896, W. E. Henley summed up in somewhat sweeping fashion in these words: "Art is short and time is long; and we care nothing for art and almost as much for time; and there is little, if any, to choose between Mudie's latest 'catch' and last year's 'sensation' at Burlington House." For much of this the age was responsible.



CHARLES DICKENS.

The intense struggle for existence was beginning, the pace of the motor was superseding the pace of the horse, and the metronome of the public mind was adjusting itself to match. The rush and tear naturally affected the output of all but the most earnest and most independent thinkers, while the increased facility for the education of the masses created a demand for fiction that was omnivorous and insatiable. Quality, which was the characteristic of the work of the first three quarters of the 19th century, gave place to quantity, and the manufacturers of novels spent their time in inventing or reviving many variants of the species. With the regularity of clockwork were produced types of the historic, the pastoral, the satirical, the humoristic, the didactic, the picturesque, the entirely human, and the entirely idyllic, together with imitations of the novel *de mœurs* and the novel *intime* as the French describe the tales of Society and sex. The stories were unfolded in three ways: in the impersonal mode of Fielding;

or in a reverse way, by pouring the narrative from the mouth of the principal actor, in the style of Defoe; or by means of letters and old documents placed at the disposal of the reader after the



THACKERAY.

(After the painting by S. Lawrence.)

manner of Richardson. The first process is now the most popular and there is growing appreciation of romancers who move their automata without hinting of the showman.

Before passing on to the writers of the 20th century it is interesting to note the advance of the feminine mind and the development of the heroine in fiction. After Fielding's clever sister came Mrs. Radcliffe and Miss Burney (Madame D'Arbly), whose *Evelina* created a sensation in 1778. What was then called polite fiction was created by her and imitated by others till Jane Austen's perfect workmanship produced a masterpiece of its kind in *Sense and Sensibility* (1811). Miss Edgeworth followed, and soon the 19th century was illumined by the passionate work of the Brontës—Charlotte and Emily—the delicate craftsmanship of Mrs. Gaskell, and the noble and masculine mind of George Eliot (Miss Evans). After the middle of the century various talented novelists were budding. Mrs. Henry Wood was inventing startling plots with a fecundity that has only been excelled by Miss Braddon; and Miss Yonge, Miss Mulock (Mrs. Craik), Mrs. Oliphant, and Miss Betham-Edwards were beginning to loom large on the horizon. A great place in fiction was taken later by the poetic and picturesque novels of Ouida, while Edna Lyall (Miss Bayly), Mrs. Alexander (Mrs. Hector), Mrs. Lynn Linton, Miss Rhoda Broughton, Miss Helen Mathers, and Miss Jessie Fothergill wove love stories that maintain their attraction despite the crowd of writers whose names fill the first decade of the 20th century. Among the well-known women novelists of to-day may be mentioned Lucas Malet (Mrs. Harrison), *The Wages of Sin*; Mrs. Flora Steel, *On the Face of the Waters*; Mrs. Humphry Ward, *Robert Elsmere*; Miss Marie

Corelli, *Romance of Two Worlds*; Sarah Grand, *The Heavenly Twins*; Mrs. B. M. Croker, *Pretty Miss Neville*; Lady Ridley, *The Story of Aline*; Mrs. Thurston, *John Chilcote, M.P.*; Violet Hunt, *A Hard Woman*; Mrs. Stepney Rawson, *A Lady of the Regency*; and John Oliver Hobbes (d. 1906), *Some Emotions and a Moral*. Other popular writers are Mrs. Campbell Praed, *Zack*, Miss Beatrice Harraden, Mrs. Riddell, Miss Walford, Mrs. L. T. Meade, "George Egerton," Mrs. E. T. Fowler, Mrs. Hinkson, and Elizabeth Robins.

The great male contemporaries of Dickens and Thackeray were many. They included Captain Marryat, Charles Lever, Samuel Warren, Charles Reade, Anthony Trollope, Captain Mayne Reid, Charles Kingsley, Whyte Melville, Wilkie Collins, George MacDonald, George Augustus Sala, R. D. Blackmore, Edmund Yates, Laurence Oliphant, Henry Kingsley, Justin McCarthy, the Rev. S. Baring-Gould, J. H. Shorthouse, William Black, and Sir Walter Besant.

Among notable authors, not already mentioned, who achieved success towards the close of the 19th century were Rider Haggard, *King Solomon's Mines*; F. Anstey, *Vice Versa*; W. Clark Russell, *The Frozen Pirate*; Grant Allen, *The Woman who Did*; T. H. Hall Caine, *The Manxman*; Sir A. Conan Doyle, *The Adventures of Sherlock Holmes*; Anthony Hope, *The Prisoner of Zenda*; Ian MacLaren (Rev. J. Watson), *Beside the Bonnie Briar*



CHARLOTTE BRONTË.

(After the portrait by George Richmond.)

Brush; George Du Maurier, *Trilby*; W. H. Mallock, *Romance of the Nineteenth Century*; I. Zangwill, *The Children of the Ghetto*; R. Whiteing, *No. 5*

John Street; Stanley Weyman, *A Gentleman of France*; G. S. Street, *The Autobiography of a Boy*; A. T. Quiller-Couch, *Dead Water's Rock*; Eden Phillpotts, *The Secret Woman*; Sir Gilbert Parker, *Seats of the Mighty*; A. Morrison, *Tales of Mean Streets*; H. Seton Merriman, *The Sowers*; Maurice Hewlett, *The Forest Lovers*; R. H. Hichens, *Relix*; J. M. Barrie, *The Little Minister*; E. F. Benson, *Dodo*; George Moore, *Esther Waters*; S. R. Crockett, *The Raiders*; Max Pemberton, *The Iron Pirate*; James Grant, *The Romance of War*; H. G. Wells, *The Time Machine*; and E. W. Hornung, *A Bride from*



GEORGE ELIOT.

(After the drawing by Sir Frederick Burton.)

the Bush. Other popular novels are by G. Gissing, J. M. Cobban, Robert Barr, Thomas Cobb, Percy White, W. W. Jacobs, H. B. Marriott Watson, A. W. Mason, and B. L. Farjeon. Marcus Clarke's *For the Term of his Natural Life* and Rolf Boldrewood's *Robbery under Arms* may be cited as examples of Australian novels worthy of a place in any current review of fiction.

In France the contemporary of Scott was the amazing Balzac (1799-1850), with his powerful and pulsating pictures of reality, followed by his pupils Charles de Bernard and the fastidious Flaubert. The last, in his masterly arrangement of fiction, influenced his disciples Guy de Maupassant and Émile Zola, whose works are remarkable for their inflexible quest after truth and their unrelenting treatment of human problems. Other luminaries of the age were Eugène Sue, Alexandre Dumas, Théophile Gautier and George Sand (Madame Dudevant), a woman who, by reason of her intellectual fecundity and the spontaneous romance of her art, is looked on as the magician or fairy chief of the French school. Later came Feuillet, Feydeau, Edmond

About, the brothers de Goncourt and the younger Dumas. To-day we have the books of George Ohnet, Daudet, Pierre Loti and Paul Bourget, beside the clever tales of many women fictionists.

In Germany the Baroness Hahn Hahn has a great reputation. In Norway Björnson has done for the novel what Ibsen effectually accomplished for the drama. In Sweden, Frederika Bremer's writing stands forth; in Denmark Hans Andersen's romancing for children remains unequalled, and various Dutch names—E. Bekker, A. Dekken, E. Post, and Bilderdyk—are justly celebrated. Russia has been made great by the splendid work of Turgenieff and Tolstoi, Hungary by that of Jokai, and modern Italy shines with the effulgence of the poetic name of Gabriel d'Annunzio, and the serious and psychological work of Antonio Fogazzaro.

In closing the account of the ancestry of the novel some notice must be taken of the influence of American writers on English fiction. Washington Irving, Fenimore Cooper, Nathaniel Hawthorne, E. A. Poe, and O. W. Holmes were forces recognised throughout the literary world, and Mrs. Beecher Stowe, by means of *Uncle Tom's Cabin*, dealt a death-blow to the Slave Trade. At the end of the 19th century a remarkable figure formed one of the chief attractions of the novelist's sphere. Henry James brought an entirely new influence to bear on the makers of tales—an influence which tempered their passions and rebuked their language and set an example of subtlety of style and fastidiousness of diction which many criticise but none can imitate. W. D. Howells told tales of truth and nothing but truth with perfectly unbiased fidelity; and Mary Wilkins, maintaining the truth, stuccoed her stories with sweet sentiment that found many admirers. A disciple of the same school is Kate Douglas Wiggin, whose *Rebecca of Sunnybrook Farm* strikes a new note in modern fiction. Among other American writers who have gained popularity in England must be noted T. Winthrop, T. B. Aldrich, E. S. Phelps, Julian Hawthorne, Frank Stockton, N. P. Willis, S. L. Clemens (Mark Twain), Bret Harte, F. Marion Crawford, Henry Harland, Mrs. Hodgson Burnett, and Gertrude Atherton.

November (Latin, *novem*, "nine"), the ninth month in the old Roman year (which began in March), and the eleventh month in the new Roman and English years. It contains 30 days. The chief festivals of the month are All Saints' (1st), All Souls' (2nd), St. Hubert's (3rd), St. Martin's (11th), St. Cecilia's (22nd), St. Catherine's (25th), and St. Andrew's (30th). The Gunpowder Plot (the 5th) was at one time commemorated in England by the exhibition of guys, a general display of fireworks and bonfires, but such popular observances are fast lapsing into desuetude. In London, Lord Mayor's Day (the 9th) is the occasion of a civic procession, more or less elaborate, to the Courts of Justice, where the incoming chief magistrate is presented to the Lord Chancellor and the judges. In the evening a banquet is held in Guildhall, which is usually attended by some of the leading ministers of the day, who have been known to make important

political announcements in the course of their after-dinner speeches.

Novgorod, a government of north-western Russia, bounded on the N. by Olonetz, on the E. by Vologda, on the S.E. by Yaroslavl, on the S. by Tver, on the S.W. by Pskoff, and on the W. by St. Petersburg. It contains an area of 47,300 miles. There are many lakes, marshes, and forests. The chief rivers are the Volkhov, Msta, Sheksna, and Mologa. The largest lakes are Ilmen, Bieloe, and Nozhe. The soil is very intractable, but some rye, oats, and other cereals are raised. The principal trades are building, fishing, shipbuilding, and smith's work. The industries comprise match factories, distilleries, glass-works, and saw-mills. Pop. estimated at 1,400,000. The capital **Novgorod** ("New Town"), situated at the point where the Volkhov flows from Lake Ilmen, is one of the most ancient cities in Russia. It was at the invitation of its inhabitants that Rurik crossed the Baltic about 862, and on the Kremlin Square stands a monument commemorating the 1,000th anniversary of the foundation of the Russian empire. Novgorod formed a connection with the Hanseatic League, and became a wealthy republic, till its prosperity aroused the envy of Ivan III., who almost completely destroyed it in 1471. It has now little trade. Among its ancient buildings the most important is the church of St. Sophia, built in imitation of that at Constantinople. Pop. (estimated), 27,000.

Novotcherkask, a town of southern Russia, capital of the government of the Don Cossacks, on a hill 300 feet high, near the junction of the Aksai and the Don, 40 miles from the sea of Azov. The town dates from 1805, when the inhabitants of Old Teherkask were driven hither by floods. Distilling, candle-making, and brick-making are leading industries, and anthracite coal is mined in the vicinity. Cattle-rearing and farming are also carried on. Pop. (estimated), 57,000.

Noyades ("drownings"), a method of executing persons, practised at Nantes during the Reign of Terror (1793-4). To Jean Baptiste Carrier (1756-1794) belongs the eternal infamy of devising a scheme of murder *en masse* whereby the numbers of disaffected and moderate alike were immediately reduced. The victims were bound and stripped and placed in a boat with a movable bottom; the boat was taken into the middle of the Loire and the bottom suddenly opened. Other unhappy persons were bound hands and feet and flung into the stream. Others were huddled together and shot down remorselessly. At last the brutality of this ruffianly pro-consul disgusted even his case-hardened masters. He was recalled to Paris, and perished by the guillotine.

Noyon, a town of the department of Oise, France, 67 miles N.N.E. of Paris. The principal structures are the 12th-century Transitional Cathedral of Notre Dame, the Renaissance Episcopal Palace, the Hôtel de Ville, partly Gothic and partly Renaissance, and the fountain adorned with

statues built in 1770 by Bishop Charles de Broglie. The manufactures include sugar, leather, textiles, and machinery. The chief historical associations of the ancient town are the coronation of Charlemagne in 768 and the birth of John Calvin in 1509. Pop. (1901), 7,443.

Nubar Pasha, statesman, son of an Armenian merchant named Moghreditch, was born at Smyrna, Asia Minor, in January, 1825, and educated in France. After acting as secretary to Mehemet Ali, Ibrahim Pasha, and Abbas Pasha, he was sent to London to counteract the policy of the Sultan of Turkey, who was attempting to frustrate the treaty under which the Egyptian viceroyalty was vested in the family of Mehemet Ali. For his success in this mission he was created bey. In 1856 he took charge of the transport service through Egypt to India, and organised railway communication between Cairo and Suez. When Ismail Pasha became ruler of Egypt he sent Nubar to Constantinople to arrange for the completion of the Suez Canal, the change of title to that of Khedive, and the altered order in the succession. The diplomat succeeded and was made pasha. He was appointed Minister of Public Works in 1863 and, three years later, Minister of Foreign Affairs. In 1867 Ismail was declared Khedive, and afterwards Nubar achieved his greatest triumph when he induced the Powers of the world to exchange their independent privileges for a mixed International Court with a uniform code binding on all. Ismail's extravagance compelled Nubar to respect foreign claims and to form a mixed Ministry with one British and one French colleague. The Khedive intrigued for the dismissal of Nubar and the strong ministers, but was himself deposed in 1879 in favour of his eldest son, Tewfik. Nubar was called to the Premiership in 1884, but he found his task thankless and difficult, owing to European complications, and resigned office in 1888. He returned to the post in 1894, but recognising that Egyptian administration now resided in the hands of the British minister, he finally retired from political life in 1896 and died in Paris in January, 1899.

Nubia, a large tract of North-east Africa, now forming part of **ANGLO-EGYPTIAN SUDAN**. It extends from the latitude of Wady Halfa in the N. (22°) to that of Khartoum in the S. (15° 30'), and from the Red Sea in the E. to the Desert of Sahara in the W. It thus includes the valley of the Nile within these limits and its important right-hand tributary, the Atbara. Practically the region of fertility is confined to the wadis or ravines and the narrow area directly influenced by the streams. In other respects the land is a sandy and rocky wilderness, the great Nubian Desert on the east of the Nile being of stony character, whilst that of Bayuda on the west, within the vast bend of the river, resembles a sandy steppe, with a scanty growth of mimosa and sedgy grass in favourable spots. The general barrenness is relieved only by an occasional oasis except in the south-east, where is a fertile district, watered by the Atbara. Elsewhere there is little vegetation beyond the mimosa, palm, and senna plant. The chief crops are durra

millet), barley, cotton, indigo, tobacco, senna, coffee, and dates. The desert Arabs raise some cattle, sheep, and goats. Camels and gazelles are the best known of the fauna. Suakin on the Red Sea is the principal port. The manufactures consist almost wholly of articles for the domestic use of the natives. There is considerable through-trade with Egypt and Central Africa, and several caravan routes cross the country. Nubia was reduced by Mehemet Ali in 1820, and continued under Egyptian sway till 1882, when first the Mahdi and then the Khalifa established a domination that was not crushed until 1898, when the authority of Egypt was restored. On January 19th of the following year the administration of the whole of the Eastern Sudan was undertaken jointly by the governments of Egypt and Great Britain. Neither the area nor the population of Nubia has been exactly determined, though the area of Nubia proper was generally estimated at 350,000 square miles, with a population of about 2,000,000. Khartoum is the seat of government.

Nubians, a historic Negroid people, who give their name to the land of Nubia. Here they form three distinct groups, speaking well-marked dialects of a common stock language: (1) *Mattokki* (*Bani Kenz*) from Egypt to Korosko; (2) *Saidokki* (*Mahat, Marisi*) from Korosko to Wady Halfa (Second Cataract); (3) *Dongolawi*, thence to Meroe. The Nubians, who now call themselves Barabira, are fundamentally of Negro stock, speaking a language closely related to that of the pure Negro Nubas of south Kordofan, whence they migrated to the Nile Valley, where the Nubæ are already mentioned as "a great nation" by Strabo (about A.D. 14). In this region they have intermingled with the Hamitic Blemmyes (Bejas) and the Semitic Arabs, so that the type is now greatly modified, though still distinctly Negroid—deep bronze or mahogany colour, woolly or strongly frizzled black hair, tumid lips, very large black eyes, scant beard worn under the chin like that of the Ethiopians on the Egyptian temples. All have been agriculturists and Mohammedans since the 14th century, when their Christian kingdom of Dongola was overthrown by the Arabs after flourishing for over 700 years. The Mahdi, Mohammed Ahmed, was a Nubian of Dongola. At one time the Nubians took an active part in the political movements and slave-hunting expeditions of Eastern (Egyptian) Sudan.

Nucleus, a structure occurring in almost every cell, whether animal or vegetable, and now recognised as of the highest importance in the life of the cell. The division of the protoplasm in cell-division is generally preceded by that of the nucleus, and it has been observed that, whilst a mass of protoplasm escaping from a broken cell of the alga *Vaucheria*, if it contain a nucleus, will form a cell-wall and grow into a new plant, if it contain no nucleus it will simply decompose. Every nucleus apparently originates from the division of a pre-existing one, and, whether animal or vegetable, goes through an identical series of changes in itself dividing. It is denser than the protoplasm, con-

tains more phosphorus, and is more deeply stained by carmine. It has a limiting membrane or nuclear wall of a reticulate character, with more fluid contents, and contains two or more rounded bodies known as nucleoli. Though rounded when the cell is not dividing, it becomes spindle-shaped, and is then constricted into two spindle-shaped parts before dividing, whilst the granules of the protoplasm group themselves in plume-like lines radiating from its extremities like iron-filings in the magnetic field. These groupings are known as karyokinesis or karyolitic figures. The term nucleus was also applied to the body of the ovule as distinct from its coats; but, to avoid ambiguity, this structure is now preferably known as the nucellus or terceline. Every animal begins life as a simple cell [EMBRYOLOGY; CELL], while some animals (all in the phylum Protozoa) remain permanently in this form. One part of the cell is always separated from the remainder as a compact dark spot, which is known as the nucleus. In its simplest form this is merely a rounded spot which is homogeneous in composition; the material of which it consists is called nuclein or chromatin. The latter name is given to it from its property of absorbing staining reagents much more readily than the rest of the cell. In most cases the nucleus is constructed on a more complex plan. The nuclein is arranged into a long thread, which may be twisted into an intricate series of knots or woven into a reticulate meshwork. The spaces between the nuclein threads are filled with a fluid material known as caryoplasma or achromatin, the latter name being derived from the fact that it is not readily coloured by staining reagents. The nucleus plays an important part in the division of the cells in their multiplication. There are certain bodies resembling cells in all respects except in the absence of a nucleus. Such are known as cytodes. The term nucleus is also used in zoology for a few other structures, such as the digestive organs of salpa.

Nuculane, a succulent or berry-like fruit different from the true berry in being "superior," formed, that is, entirely from carpellary structures, and from the drupe in originating from more than one carpel and having no "stone" or hard endocarp. It is a type of fruit occurring in many widely-different orders and exhibiting considerable variety. It has generally a thin outer skin or epicarp; but this is often hardly separable from the pulpy interior. In some passion-flowers this exterior is tough almost to brittleness; and in the variety known as *hesperidium*, the fruit characteristic of the orange tribe, it is thick and leathery. Other examples are the tomato and other Solanaceæ, asparagus and lily-of-the-valley.

Nudibranchiata, a term once used for all the slug-like Gastropoda, but now abandoned, as the members of it have been distributed between two separate divisions of the order Euthyneura. Thus some, such as *Aplysia* and *Doris*, belong to the sub-order Opisthobranchia and others, such as the slugs *Arion* and *Limax*, to the sub-order Pulmonata.

Nuer, a large Negro nation, who occupy the swampy region of the Upper Nile near the Bahr-el Ghazal and Sobat confluence, south of the Shilluks and co-terminous with the Dinkas, whom they resemble in their remarkably long legs and broad flat soles, useful in traversing the quagmires of their watery domain. The Nuers pay great attention to their head-dress, which they build up into fantastic shapes, while the young women pierce the



NUER CHIEF.

upper lip for the insertion of a bone or ivory rod, two or three inches long, covered with bright glass beads. Like the Dinkas, they own numerous herds of magnificent cattle, which they tend with great care, though living mostly on fish, corn, and roots. There are numerous tribal divisions, all of which retain the patriarchal system of government, every village community having its distinct *hengdid*, or "lord," who is regarded as head of the family, controlling all domestic and general affairs.

Nuisance may be either public or private. (1) A public or common nuisance is an act by which the enjoyment of a right is interfered with, such as the right to light and air, to travel, not to be exposed to danger from infectious disease, etc. Accordingly the carrying on of a manufacture from which noxious exhalations are emitted, or the exposure for sale of unwholesome food, or the stopping or obstructing a highway, etc., are public nuisances. The remedy for a public nuisance (which ranks criminally as a misdemeanour) is by indictment or information; and, if special damage is caused, an action for damages or injunction will lie against the wrong-doer. Modern legislation has also provided a summary way of dealing with nuisances; for by the Public Health Acts, local sanitary authorities are required to ascertain by inspection what nuisances exist within their districts, and the justices are empowered to deal

summarily with such as are found to exist. (2) A private nuisance is such a continuous infringement of a natural right of property as could, in process of time, give the wrong-doer an easement or prescriptive right to do an act which was originally tortious (that is, a wrongful act for which, if legally established, damages would accrue). Thus, if a man builds his house so close to his neighbour's that his roof overhangs it, or if he carries on a noisy or offensive trade, these are nuisances for which an action lies. The remedy for a nuisance is either by abatement or by action for damages, injunction, or mandamus.

Nullipores. [CORALLINES.]

Numantia, a town of Hispania Tarraconensis (Northern Spain), on the Durus (Douro), which has been identified with a spot near the present village of Puente de Garay, four miles north of Soria in Old Castile. It was a stronghold of the Arevaci, the most powerful tribe of the Celtiberi, and is famous for its heroic defence for eight months against the might of Rome. The siege began in 134 B.C. and ended in the following year when the defenders were on the verge of starvation. Publius Scipio Africanus the Younger, the victorious general, sold the inhabitants into servitude and razed their town to the ground. He received from his grateful countrymen the further title of Numantinus in honour of his conquest.

Numa Pompilius, the second mythical King of Rome, was born at the Sabine town of Cures, and reigned 43 years. Aided by the counsels of the nymph Egeria, whom he used to meet in a grove near the city, he established the chief religious orders and ceremonies, reformed the calendar and laid the foundation of a civilised mode of life.

Numbers may be divided into two classes. If a number contains no factor greater than unity it is said to be prime, while one which is divisible by other numbers is said to be composite. Two numbers which have no common factor are said to be prime to each other. From these definitions arise a number of elementary theorems, among which are the following:—(1) If a prime number, a , divide a product, $b \ c \ d$, it must divide at least one of the factors, b, c, d ; (2) if a number be prime to two other numbers, it must also be prime to their product; (3) if two numbers be prime to each other, their squares, cubes, etc., are also prime to each other; (4) a number cannot be decomposed into prime factors in more ways than one; (5) the number of primes is unlimited; (6) no formula can be found expressing prime numbers only. Numbers can be expressed by many different algebraic formulæ which are useful for the determination of the properties of, and theorems relating to, numbers. Thus we can quite easily find the sum of any series of consecutive numbers starting from unity, or the sum of their squares or cubes, and still more simple is it to find the number of divisors which any number can have. The product of any two consecutive numbers is divisible by 2, the product of any three consecutive numbers is divisible by 6,

that of any four by 8, and so on. The theory of numbers is, however, very extensive, and includes the theory of equations, so that it forms an important branch of algebra. Numbers have been studied from very early times, while Fermat, Euler, Legendre, Lagrange, Gauss, Cauchy, etc., have greatly extended the science. Many theorems are known by the names of several of these illustrious mathematicians.

Numbers, Book of, the fourth book of the Hexateuch, as the first six Books of the Old Testament are collectively called, the name having replaced that of Pentateuch, which was limited to the first five Books. The ascription to Moses is now regarded as merely nominal. The Book received its name (*arithmoi*, Greek Septuagint; *numeri*, Latin Vulgate) from the fact that it begins with a census of the Israelites on the first day of the second month of the second year of the Exodus, giving the numbers in the different tribes of "all that were able to go forth to war." It covers a period of over thirty-eight years, namely, from the year just mentioned to nearly the close of the fortieth year. As a whole it is concerned partly with law and partly with history, and may be divided into three sections—the Camp at Sinai (i. to x., 10); the Wanderings (x., 10 to xix.); and the "Plains of Moab by Jordan near Jericho" (xx. to xxxvi.).

Numidia (Greek *Nomadia*, "land of Nomads") in ancient geography was a territory of north Africa, bounded on the N. by the Mediterranean, on the E. by the Roman province of Africa (Tunis), on the S. by the Atlas mountains, and on the W. by Mauritania (Morocco), and corresponded roughly to the modern Algiers. Numidia became a formidable antagonist of Rome under Jugurtha and Juba I.; after the defeat of the latter in 46 B.C. it was formed into a Roman province. When Juba II. was made King of Mauritania by Augustus, western Numidia was incorporated in his dominions, and the name was henceforth confined to the eastern part of the former province. Its people, the progenitors of the modern Berbers, were a warlike race, skilful horsemen, but notoriously faithless. Cirta, the seat of the Numidian kings, was afterwards known as Constantina, the present Constantine. The remains of Hippo Regius, the see of Augustine, one of the great Christian Fathers and by birth a Numidian, may still be traced near Bona.

Numismatics, the science which deals with coins and medals, especially with regard to their classification and history. Coins in numismatics mean those pieces of metal which are circulated as money, whilst medals mean those which are made to celebrate some person or event, although some collectors often call ancient coins medals. The science is very important, because very often coins are the only means by which we can trace the history of kings and countries.

Nummulites, a genus of large Foraminifera, which is the type of the family Nummulitidae. The genus is now extinct, but was very abundant in

the Eocene, during which it built up enormous masses of limestone, known as the Nummulite Limestone.

Nummulitidae, a family of perforate Foraminifera, including the highest and largest members of this class. The characteristics of the family are that the shell is composed of carbonate of lime and is punctured by a large number of minute tubuli. It consists of many chambers, which are separated by walls thickened by an intervening layer known as the supplementary skeleton; the chambers are connected by a branching canal system which ramifies throughout this layer. The chambers are usually arranged in a flat spiral. The family includes three sub-families: (1) the Fusulinine, now extinct, which formed great beds of limestone in the Carboniferous period; (2) Cyclocypinae, including the genus Orbitoides, which is common in Cretaceous and Tertiary rocks; and (3) the Nummulitinae, of which Nummulites is the type-genus. Amphistegina is representative of another group of this sub-family. The main interest of the Nummulites is geological, as they lived in such vast numbers in the seas of former periods that their shells form extensive sheets of limestone, e.g. the Nummulite Limestone of the Mediterranean and Indian Eocene systems.

Nun, the common name applied to various orders of women who are devoted to religious lives under vows of poverty and celibacy. They are the correlatives of monks and live in nunneries under the orders of a superior, who is called Abbess, Prioress, Mother Superior, or Reverend Mother.

Nunc Dimittis, the name given to the canticle of Simeon (Luke ii. 29-32), from the first two words of the Latin version. It forms part of the office of compline in the Roman Catholic Church and is used also at evening prayer in the Anglican Church. It occurs in the service of the Greek Church as the private thanksgiving of the priest after the liturgy.

Nuneaton, a town of Warwickshire, England, on the Anker, 8 miles N. by E. of Coventry. The principal buildings are the church of St. Nicholas, St. Mary's Church, erected in 1877 on the ruins of the old priory established in 1150 (from which the town derives its name), and the grammar-school, founded in 1553. The industries include tanning, textiles, and iron-founding. George Eliot, who was born at Arbury in the parish of Chilvers Coton, received part of her schooling at Nuneaton. Pop. (1901), 24,996.

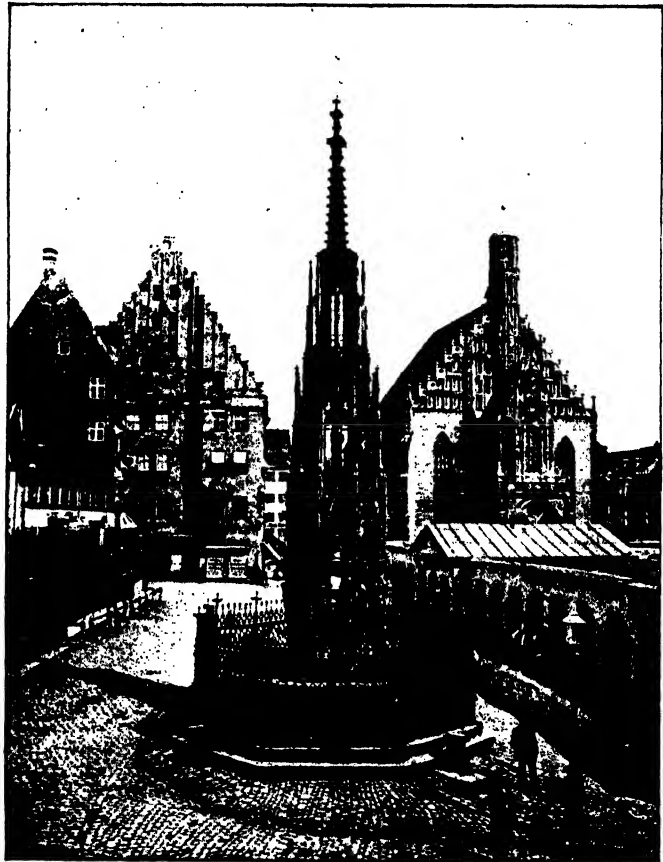
Nupe, a state of Northern Nigeria, West Central Africa. It was once a large and powerful Negro nation, whose territory extended along the left bank of the Niger from above the Benue confluence to the Bussa Rapids, about 10° N. The old Nupe kingdom was overthrown about 1825 by Mallam Dendo, nephew of Osman dan Fodjo, founder of the Fulah empire of Sokoto. Since that time most of the Nupe people, formerly pagans, have become Mohammedans, and their Emir (prince), a descendant of Dendo, is one of the most

powerful vassals of Sokoto. The Nupe, a branch of the widespread Yoruba race, are a peaceful, industrial people, occupied in trade and agriculture, skilled weavers, blacksmiths, and potters. Bida, capital of the principality, though of recent foundation, is one of the great cities of West Africa and has manufactures of leather goods and glass.

Nur ed-Din Mahmud, MALEK AL ADEL, was born at Damascus in 1117, and in 1145 succeeded his father, Omad ed-Din Zenghi, who had rebelled against the Seljuks, as sultan of north Syria. Nur ed-Din made Aleppo his capital, and gradually extended his dominions, repelling the 2nd Crusade and seizing the Christian fields in Syria. Damascus, a Seljuk possession which was virtually independent, fell into his hands in 1153. His designs on Egypt were forestalled by his nephew Saladin and war between the two would probably have ensued if the life of Nur ed-Din had been prolonged. He died at Damascus in May, 1173. He was an enlightened ruler, who endeavoured to promote the welfare of his subjects.

Nuremberg (German, *Nürnberg*), a picturesque old city of Bavaria, on the Pegnitz, in the province of Central Franconia, 95 miles N.N.W. of Munich. Most of the houses date from the 16th century, and the mediæval appearance of the town has been preserved by imitating the antique style of architecture, with its red-tiled roofs, oriel windows, and high sharp-pointed gables facing the street, though electric lighting, railways and tramcars lend much more than a touch of modernity which often jars on the visitor. The old double wall retains nearly 100 of its turrets, besides several gateways; the fosse has been converted into gardens. The fine Burg or royal palace, originally built by Conrad II. (*circa* 1024) has been little changed since the reign of Frederick Barbarossa (*circa* 1158). Of the churches the most notable are those of St. Lorenz, St. Sebald, and Our Lady, dating from the 13th to the 15th century. The town hall (1616-19), in Renaissance style, has frescoes by Albert Dürer. The modern buildings include a Germanic National Museum (1852), a Bavarian Industrial Museum (1877) and a library of 70,000 volumes. The houses of Albert Dürer, Hans Sachs, and many families of mediæval

renown are still in existence, and the Schöne Brunnen is one of the most beautiful fountains in the world. Nuremberg was made a free imperial city in 1219, and owing both to its native manufactures and its situation in the great commercial highway from the Levant to Western Europe, became an extremely wealthy town, reaching the height of its prosperity in the 16th century, but losing much of its importance in this respect through the discovery of the Cape of Good Hope route to India and the East. It was one of the first places north of the Alps to come under the stimulating influence of the Renaissance, and it occupies a conspicuous position in the history both of art and of literature. Nuremberg is now the leading commercial town of Bavaria, with manufactures of children's dolls and toys, chemicals, lead-pencils, paints, type, carved objects in metal, wood, and other materials, etc., while it is a hop market of first-class importance and still plays a prominent part as an emporium of general commerce. Pop. (1900), 261,081.



THE SCHÖNE BRUNNEN, NUREMBERG.

Nurhag, a prehistoric monument peculiar to Sardinia, where some thousands occur. They are round towers, of one, two, or three storeys, with sloping sides, the height being generally equal to the width of the base. A staircase leads to a platform on the top. Their origin and purpose are matters of surmise, but it is probable they were places of refuge and offence in primitive times. The talyots of Majorca and Minorca bear some external resemblance to these towers; but it is not known whether they possessed a staircase, and there is always a table formed of an upright flat stone, with a similar stone crossing it.

Nursery Rhymes, children's jingles, usually about four lines long, repeated to amuse or while at play. Nursery rhymes have arisen from many sources, some of them being reminiscent of days when incantations to bewitch away disease or foretell the future were sung around the camp-fires at night, and as often as not they are of great antiquity. Being in verse they have been handed down from generation to generation more easily than if they had been in prose, and the child, whose mother or nurse repeats them in the course of nursing or dandling, soon gets to learn them and, in its turn, passes on the metrical jingles to its children, thus ensuring the survival of the many nursery doggerels. We have only to look at the rhymes themselves to see how they first originated. Many of them still cling to the games to which they belonged. The old ring songs, the May games, and village dances of Merrie England furnished us with many of the current nursery rhymes and children's songs. In the matter of games childhood has been shown to be singularly conservative; witness the modern survival of the knucklebone game played by the ancient Greeks and the Egyptian tomb-paintings which prove that the London Cockney boy playing at tipcat is amusing himself with a pastime which delighted the children in the streets of Syene and Memphis six thousand years ago. Again Pope, in his *Memoirs of Martinus Scriblerus*, mentions that handy-dandy is talked of by Plato, and there can be no doubt that some such game existed and was played by the Greeks. This is the present-day game of guessing in which hand an object has been placed, played in many countries to the following rhyme:—

"Handy-Dandy riddledly ro,
Which will you have, high or low?"

The Scots stanza is even more effective:—

"Nievy, nievy, nick-naek,
Which hand will ye tak' ?
Tak' the richt, or tak' the wrang,
I'll beguile ye if I can."

The boy who plays by the pond trying to see who can cause a stone to skim the surface of the water most frequently and form the most circles, saying the while:—

"A Duck and a Drake
And a halfe perie cake" (or "a penny white cake"),

does not for one moment imagine that he is playing the same game and chanting practically a translation of a doggerel that the Greek children used

two thousand years since. In one part of England will be found a doggerel chanted by the little groups of children playing on the village green which may be entirely unknown to children in another part of England, showing clearly that it was of local origin. In other countries of the world we find exactly the same derivation of nursery rhymes and folklore doggerel. In Germany most of the nursery jingles arise from games that are still in vogue or have been played until quite a recent period. Take as an example the short doggerel yet used in parts of England and frequently in America amongst the children as a ring song, as follows:—

"As we go round the mulberry bush
All on a frosty morning."

This is purely an old May ring game to which a writer of the 16th century alludes as being a morning dance practised at the time, and which has survived to the present day. Some nursery rhymes, however, are quite *parvenus*. Such is that of Jack Horner known to every English child. This was written by Jack Horner himself as a satire on the Puritan aversion from the pies, puddings, and other good things under which tables generally groaned at Christmas. Much in the same way "Jack Spratt could eat no fat" arose. The Jack Spratt alluded to was no less an exalted personage than an Archdeacon whose domestic and gastronomic felicities were such that they were locally embodied in verse and became immortal. The original lines are said to have run as follows:—

"Archdeacon Spratt could eat no fat,
His wife could eat no lean;
'Twixt Archdeacon Spratt and Joan his wife,
The meat was eat up clean."

Then, again, take that nursery rhyme which every child has heard—

"Hey diddle diddle,
The cat scamped the fiddle,
The cow jumped over the moon,
The little dog layed,
To see the sports played,
And the dish ran away with the spoon."

This is a translation from the Greek by George Burges, and therefore its antiquity cannot be doubted even if its translation is not quite correct. Nursery rhymes sometimes arose from riddles such as:—

"As I was going o'er London Bridge,
I heard something crack;
Not a man in all England
Can mend that!"

to which the answer is "Ice." Then, again, the following:—

"A house full, a yard full,
And we can't catch a bowl full!"

the solution of which is "Smoke." Sometimes we find the derivation of nursery rhyme arises from popular observation or study of Nature, such as, "Who killed Cock Robin," or

"Rain, rain go away,
Come again another day."

Many of the round games played by children are, of course, not peculiar to the nursery, and some of

them are sung to rhymed couplets of considerable merit, such as the ever-popular "Oranges and Lemons." In seasons of great national crises one may almost witness, so to say, the birth of the nursery rhyme. At the time of the Napoleonic wars the name of Bonaparte in England and of Wellington in France was a name to conjure with in the nursery and became the subject of verses in both countries. The opening lines of the favourite rhyme with French *bonnes* of the period was Englished thus:—

"Baby, baby, naughty baby!
Hush you squalling thing, I say,
Hush your squalling, or it may be
Wellington will come this way."

Many of the older English nursery rhymes which have died out, except in a few rural places, still exist in America such as "The Miller of Gosport," "How many miles to Babylon," while more recent importations into the New World that may yet be met with in England are "Here we come gathering nuts in May," and the already mentioned "As we go round the mulberry bush." Most of the best known of these have their equivalent in other languages, while some have been derived from Continental and Oriental languages.

Nursing, the care of a person who is suffering from illness or disease, or has undergone a surgical operation, or has been confined, or is permanently invalid, or of feeble mind. Broadly, therefore, nurses may be classified into attendants on medical cases, or surgical cases, monthly nurses, and nurses in charge of special patients. Nursing on anything like scientific lines dates from the middle of the 19th century. Charles Dickens's graphic portraiture of Sairey Gamp and Betsy Prig in *Martin Chuzzlewit* (1843) no doubt attracted public attention pointedly to the crafty, gin-drinking, slatternly type of nurse, yet it was impossible to expect nursing as such to be in advance of medical and surgical practice, and as this improved, latterly by leaps and bounds, so nursing became revolutionised. There had been earlier isolated attempts to train nurses properly, notably at the Protestant Deaconesses' Institution at Kaiserswerth in Rhenish Prussia, founded in 1836 by Pastor Fliedner, but it was due to Florence Nightingale and her experiences at Scutari during the Crimean War that nursing came to be regarded as a vocation, the claims of which were higher than the claims of most professions, and were worthy of at least similar intelligence, industry, study and foresight. Miss Nightingale devoted the money subscribed to her as a testimonial of the nation's gratitude to the founding of a training-school for nurses in connection with St. Thomas's Hospital in London (1860), and since then other medical schools have undertaken the training of nurses, especially London Hospital, St. Bartholomew's, St. George's, Guy's, St. Mary's, and the Hospital for Sick Children in Great Ormond Street—all in London; the Royal Infirmary, Edinburgh; the Western Infirmary, Glasgow; Sir Patrick Dun's and Meath Hospitals, Dublin; the Royal Hospital, Belfast; and the General Hospital, Manchester. In the United States, Canada, and the British Colonies similar

provision for the adequate training of sick nurses exists in the leading institutions, whilst in Paris, Berlin, Vienna and other world capitals like solicitude is manifested for scientific attendance on patients. Many of the hospitals of Ireland and other distinctively Catholic countries are largely staffed by Sisters of Mercy. The training of men as nurses is also on the increase. Several specialist physicians and surgeons have adopted the custom of establishing nursing homes in connection with their own practice, whereby they may have cases more completely under their immediate supervision and control. Queen Victoria took a keen interest in nursing and founded a Jubilee Institute for Nurses in 1887, with centres in London, Edinburgh, Dublin, and Cardiff, and branches in populous towns throughout the United Kingdom. She further authorised the training of Naval and Military nurses, liable to active service in war, who were styled "Her [His] Majesty's Nursing Sisters," and she sanctioned the creation (1883) of the Order of the Red Cross (ribbon: dark blue with red edge) for the decoration of women who had particularly signalled themselves by zeal and devotion in this branch of philanthropic work. All public institutions which are equipped with sick wards and which pay special attention to certain diseases are staffed with trained nurses, and the custom is rapidly growing general of entrusting private cases to properly qualified attendants. Family nursing has been on the decline ever since the community began to realise that the care of their near and dear ones in illness is a matter demanding unceasing vigilance, sympathy and skill. Of course the position of the nurse, from a financial standpoint, has altered greatly for the better. The fees in private cases vary from 1½ to 3 guineas a week, and the salaries in institutions depend upon experience and *status*. A probationer who may begin at £10 a year may receive as a sister £50, or as a matron from £100 upwards per annum.

Nut, in the strict botanical sense, is a dry, inferior, syncarpous, one-chambered fruit with a hard exterior not splitting when ripe. The hazelnut is a good example of the true nut. The term is, however, in ordinary language and in commerce applied to many other structures, such as the seeds of the chestnut, the Brazil-nut, the nutmeg, or some pines, the endocarps of the almond, the cocconut, and the walnut, and the pod of the groundnut. The seeds of many nuts are rich in oil and in nitrogenous matters, and thus, though liable to become rancid, are valuable articles of food. Their employment in diet has been greatly extended by the practice and recommendation of vegetarians. Among the chief nuts used for food are the almond, Brazil-nut, cashew-nut, chestnut, cocoa-nut, hazelnuts, hickory-nuts, nutmegs, pine-nuts, pistachionut, and walnut. Among those used as sources of oil are the almond, ben-nut, Brazil-nut, candle-nut, cashew-nut, cocoa-nut, palm-nut, and walnut. The coquilla-nut and corozo-nut, or vegetable-ivory, are so hard as to be turned into ornaments, and many others are used as beads; the poison-nut (*Strychnos Nux vomica*) is used in medicine; the clearing-nut

(*S. potatorum*), for clearing turbid water; the betel-nut, as a masticatory; and the marking-nut, as a marking-ink and varnish. The walnut, pistachio nut, cocoa-nut, and almond are extensively used in confectionery. The United Kingdom imports food-nuts annually in immense quantities chiefly from Spain, France, Brazil, and the tropical islands in both hemispheres.

Nutation is a slight wavy motion of the earth's celestial pole which affects the regularity of the precession. It is due to the fact that the earth is not a true sphere but bulges at the equator, and the moon attracts this equatorial excess of matter. If there were no precession, nutation alone would cause the earth's pole to be sometimes rather nearer to, and sometimes rather farther from, the pole of the ecliptic, a small ellipse being described between these two positions. The change in position varies with the motion of the moon's nodes, and as these nodes perform a revolution in 18½ years, that is also the time taken for the earth's pole to describe its small ellipse. The total effect of nutation and precession is to give the wavy motion above mentioned, the crest and trough differing by only 18"—the length of the longer axis of the ellipse. Small as is this inequality, which is strictly the lunar nutation, a still smaller wave motion is added, due to the position of the sun. This is the solar nutation. If we imagine small but regular ripples extending over the surface of a number of waves, then a particle made to travel over these ripples and waves would be moving in a manner representative of the resultant motion of our pole.

Nutcracker, a bird of the genus *Nucifraga*, of the crow family, with four species ranging over the Palearctic region to the Himalaya and the north of China. The bill is stout and conical, and the tail short and slightly rounded. The best-known species, *N. caryocatactes*, from the pine-forests of northern Europe and Asia, is an occasional British visitant. The length is about twelve inches; the plumage is thick and soft, for the most part shades of brown, plentifully marked with white spots, except on the wings, rump, and tail. Though its diet may be very varied, the bird's favourite food are the seeds of pine cones. *N. hemispila* is Asiatic.

Nuthatch, a bird of the Passerine genus *Sitta*, with seventeen species ranging through the Palearctic and Nearctic regions to the south of India and Mexico. The nostrils are in a groove in the straight bill, the tail is short and broad, the legs are short and stout, and the toes, of which the hinder is longer than the middle, are armed with stout claws. The species are small, tree-creeping birds, generally nesting in holes in trees, and feeding on insects (in the search for which they prise off pieces of bark with their strong bills), seeds, and nuts, and to their method of cracking the latter with blows of the bill they owe their popular names of Nuthatch, Nuthack, and Nutjobber. The Common Nuthatch (*S. casia*) is a British bird, by no means rare, but recognised with difficulty, except by practised eyes, owing to its shy nature and its

coloration, which harmonises well with the hue of the bark of the trees on or among which it lives. The length is rather less than six inches; the upper parts are slate-grey, with some black markings; the under-surface is pale cinnamon.

Nutmeg, the kernel of the seed of *Myristica fragrans*, an evergreen tree about 25 feet high, native to the Banda Islands in the East Indies. It grows under larger trees, in a light soil of volcanic origin, and in a climate of almost continuous rainfall. The fruit is pear-shaped and about two inches across. When ripe it splits, disclosing the scarlet aril or mace. The seed has a thin hard testa enclosing the nutmeg, which consists largely of what



NUTCRACKER.

is known to the botanist as ruminated perisperm, the inner integument of the seed being so folded inwards as to produce the mottled appearance seen in a cross-section. These folds suggested a comparison with the stomach of a ruminant animal. The largest and roundest nutmegs are the best, and though generally about 110 to the pound, they may be as few as 68. They are often coated with lime; this practice, which is injurious to the flavour, having originated (according to one theory) in the anxiety of the Dutch to secure their monopoly of the trade by destroying the germinating power of the seed; though it is more probable that the object of the lime coating was to kill any germs of the beetle which attacks the nutmeg with destructive effect. The Dutch monopoly was lost, for during the British occupation of Banda (1796–1802) seeds were sent to Penang, India, the West Indies, Brazil, Réunion, and elsewhere, and successfully reared. Nutmegs contain about 25 per cent.

of nutmeg butter or oil of mace, a vegetable fat now considerably employed in soap-making. In the true nutmegs the fat contains about 6 per cent. of the volatile oil, which is mostly myristicene ($C_{10}H_{18}$); but the long, wild, or male nutmegs, mostly *M. fatua*, though containing the fat, have little fragrance or value as spice. Great Britain imports from 400,000 to 800,000 lbs. of nutmegs annually.

Nutria. [COYPU.]

Nutrition. [DIGESTION; FOOD.]

Nux Vomica. The product known in commerce under this name consists of the seeds of *Strychnos nux vomica*, a tree which grows in Coromandel, Ceylon, and certain parts of tropical Asia and Australia. These seeds contain amongst other constituents two well-known alkaloids, brucine and strychnine, to which their physiological activity and toxic properties are chiefly due. It is largely used as extract and tincture in pharmaceutical preparations, being a valuable nervous stimulant, for which purpose it is frequently employed.

Nyasa, a lake of East Africa, in the Zambesi basin, between $9^{\circ} 29'$ and $14^{\circ} 25'$ S., and $33^{\circ} 50'$ and $35^{\circ} 20'$ E., about 250 miles S.E. of Lake Tanganyika. Its elevation is about 1,550 feet, with a depth of over 200 fathoms in the northern half, and a maximum of 386 fathoms off the western coast in $11^{\circ} 40'$ S. Lying at the southern extremity of the Great Rift Valley, its shores are mostly high and rocky. The distance from north to south is 350 miles, and the average breadth about 45 miles. Among its tributaries are, on the western coast, the Songwe, Rukuru, and Baa, and, on the eastern side, the Ruhuhu, while it is drained at its southern end by the Shiré, which flows southwards to the Zambesi. The highest points on its shores are the Livingstone or Kinga range (6,000 feet), on the north-east, Mount Waller, facing it on the opposite coast, and the Mapanghi hills (3,000 feet) on the south-east. Likoua and Chisumalu, towards the east centre, are the largest islands in the lake. Great Britain holds all the western shore, south of the Songwe, and the southern and south-eastern extremities; Portugal holds the rest of the eastern coast south of $11^{\circ} 30'$ S.; and Germany holds the remainder. The mission station of Livingstone, at the southern end, was the earliest settlement. Other British stations are Karonga and Bandawe. The chief German stations are Langenburg and Wiedhafen. Nyasa (the Maravi of older maps) was discovered by Livingstone in 1859.

Nyl-ghau (*Oswelaphus tragocamelus*), a large Indian antelope, most abundant in central India and occurring also in Persia. It frequents wooded country, but is often found in small herds in the open. The fore-limbs are longer than the hinder pair. The male stands about four feet high at the shoulder, is iron-grey in colour, and the horns, some eight inches long, curve slightly forward. The female, about one-third less, is hornless and, like the young, of a bright fawn colour. Both sexes have a short, stiff mane, and there is a tuft of hair on the throat of the male. The nyl-ghau is a

spirited creature, capable of offering a stiff attack. The animal has been kept in confinement and even domesticated, but its temper, especially that of the old males, is often irritable and uncertain.

Nymph, a minor Nature divinity of the ancient Greeks, the highest and most beautiful expression of the belief that natural phenomena were caused by the direct operation of spiritual beings. The nymphs were imagined as lovely maidens, of perennial youth, who were the guardian spirits of localities and natural (physical) features. The Oceanides were the nymphs of the ocean, the Nereids of the sea, the Naiads of lakes and rivers, the Oreads of mountains, and the Dryads or Hamadryads of woods and groves.

Nymphalidæ, the largest of the families of butterflies, containing seven sub-families. The main character is that the front pair of legs are generally rudimentary.

○

O, the 15th letter of the English alphabet, and the only one which is not represented in the Egyptian hieroglyphics. It was probably invented at a later date by the Semites. The Semitic name denotes an eye. Before its adoption by the Greeks, who gave it its later value, its sound was like that of *h* in *house*. The vowel *o* is intermediate between *a* and *u*, and represents several varieties of sound, according as the cavity of the mouth is more or less contracted. Thus the sounds in *not* and *cord* are nearer to that of *o* than are those in *bone* and *pour*, for the formation of which the lips are more fully rounded. Numerous digraphs take the place of the *o* in *bone*—of *coal*, *soul*, etc. *O* also denotes the neutral vowel heard in *son*.

Oak, the English name for the genus *Quercus* which forms the type of the sub-order Quercineæ of the order Cupulifera, and includes nearly 300 species, mostly large trees, though in some cases mere shrubs, natives of temperate regions and moderate altitudes in the northern hemisphere. Their leaves are scattered, simple, and pinnately veined, and have deciduous stipules. The species of warmer regions are evergreen, and have nearly entire leaf-margins, whilst the deciduous leaves of northern species are sinuate or cut. They are monoecious, bearing their male flowers in loose catkins and the female ones solitarily. The former have each a 5-7-lobed calyx and from 5 to 12 stamens; and the latter a 3-8-lobed calyx, a three-chambered ovary, and three styles. The ovary contains two ovules in each chamber, but becomes by abortion one-chambered and usually one-seeded. The fruit or acorn, an inferior nut with a leathery exterior and enclosed below in a woody cupule or cup, is characteristic. This cup is formed by an outgrowth from the peduncle bearing numerous imbricate bracts. *Q. Robur*, one of the largest species of the genus, though known as the British Oak, ranges from Mounts Atlas and Taurus to 63°

N., about the limit of wheat-cultivation in Europe, and was revered for its fruit and timber alike by Greek, Roman, Celt, Saxon, and Norseman. Vast oak-forests covered central Europe at the dawn of history, and it is still a prevalent species in south Russia, Germany, France, and England. Its wood, stained black and known as bog-oak, is found in prehistoric peat-bogs and in submerged forests. It was the favourite timber for domestic architecture among the Greeks and Romans. There are some magnificent examples in Great Britain of timbered roofs which owe their preservation to the fact that they were made of oak. The roof of Westminster Hall is a case in point and the roof of Parliament House in Edinburgh, though not so venerable, is in perfect condition. The tree sometimes reaches 100 feet in height and nearly 50 feet in girth, producing sound wood for 200 years; and, even when hollow, may retain its vitality for two or three centuries longer. The timber weighs about 50 lbs. per cubic foot or, in very hard slow-grown wood, nearly 60 lbs. When finely-grained it is valued for furniture, and in the period when the "wooden walls" of England ruled the seas was, *par excellence*, the wood employed in shipbuilding, as it had been amongst Greeks, Romans, and Phœnicians. To the wood carver the oak has proved an inestimable boon, its wood affording an almost imperishable medium for the expression of the finest work in this branch of art. The bark is a valuable product, and for long was the chief tanning material of the world. In trees from 20 to 30 years old it contains from 7 to 10 per cent. of quercitannic acid. An immense variety of insects feed upon the oak, some of them producing galls [GALL-FLIES], such as the large spongy and rosy oak-apples and the small discoid oak-spangles on the leaves. Next in importance to *Q. Robur* among European oaks is the Turkey Oak, *Q. Cerris*. The evergreen or holm (holly) oak of southern Europe, *Q. Ilex*, grows to smaller dimensions, but has very dense wood. *Q. Suber*, whence is derived a vast quantity of cork, is a similar species with a more Western distribution. The large thick acorn-cups of the Levantine *Q. Agileps*, with reflexed scales, are rich in tannin, and are imported under the name of valonia, their young acorns—also used for tanning—as *camata* or, when still younger, as *camatina*. *Q. infectoria* produces the Aleppo galls, of universal use in ink-making and dyeing. Of the numerous oaks of America—most of which are valuable as timber, though less durable than *Q. Robur*—the chief is the white oak, *Q. alba*; but several, such as *Q. rubra* and *Q. coarctata*, are grown in England, as scarlet-oaks for the autumn beauty of their leaves. The chief sources of the supply of oak timber to Great Britain are North America and the Continent, while Belgium supplements the shortage in England of the heavy yield of British bark. In weather folklore the priority of the appearance of the leaf of the oak and ash—both late trees in the United Kingdom—is very significant—

"If the oak's before the ash
Then you'll only get a splash;
But if the ash preceded the oak,
Then you may expect a soak."

Oak-Apple Day, or **RESTORATION DAY**. After his defeat at Worcester (September 3rd, 1651), Charles II. lay concealed for fully a day in the exuberant foliage of an oak at Boscombe on the confines of Shropshire and Staffordshire. Thus the tree came to be particularly associated with the King and, after his Restoration, this event was commemorated every 29th day of May by the wearing of a sprig of oak or an oak-apple (oak-gall) in the hat, the day being known as Oak-Apple Day. The oak having harboured such an illustrious fugitive as the Merry Monarch must of course be henceforth styled the Royal Oak, a title that speedily won the approval of publicans in London and other towns. The observance of the day, however, has fallen into disuse along with the form of prayer which was once read in the English Church, but has not been printed in the Book of Common Prayer since 1859.

Oakham, county town of Rutland, England, in the Vale of Catmos, 9 miles S.E. of Melton Mowbray. The 12th-century castle, though almost wholly in ruins, is the subject of a quaint custom, every peer who passes it having to forfeit either a horse-shoe or a fine. Among those who paid the fine were Queen Elizabeth, the Prince Regent, Queen Victoria, and Queen Alexandra. The chief buildings are All Saints' Church, the Institute, the Agricultural Hall, and the Free Grammar School, founded in 1584 by Robert Johnson, Archdeacon of Leicester, to which an almshouse for the poor was attached. The industries include hosiery, boots and shoes, and brewing, and the markets are important. Jeffrey Hudson (1619-1682), the dwarf page of Queen Henrietta Maria, and Titus Oates, the infamous perjurer, were natives of Oakham. Pop. (1901), 3,294.

Oakland, a town in Alameda county, California, United States. It is delightfully placed on the eastern shore of the bay, opposite to San Francisco, of which it is almost a suburb. Here the Southern Pacific Railway has its terminus, and the pier, 2 miles long, affords facilities for shipping. The town is the seat of California Military Academy, California College, Pacific Theological Seminary, and numerous other educational institutions, and was also, until its removal to Berkeley, about 4 miles to the north-east, the original home of the University of California. Many of the streets are naturally shaded with beautiful oaks (whence the town derives its name), and the environs contain a profusion of gardens and vineyards. The industries comprise iron-founding, canning, textiles, leather, jute, pottery, carriages, and agricultural implements. The town suffered severely from the earthquake that visited California on April 18th, 1906, but having escaped the additional calamity of fire, the citizens rendered prompt and generous assistance to their stricken neighbours of San Francisco. Pop. (1900), 66,960.

Oaks. [HORSE-RACING.]

Oakum, a mass of loose tarred fibres employed in shipbuilding for caulking the seams between the timbers of wooden vessels or between the

planks in the decks of iron and steel ships. It is usually obtained by untwisting old ropes and then separating the fibres, a task which is frequently imposed as a penalty in gaols.

Oasis, a fertile spot in the midst of a desert, caused by the presence of a well or spring. The word is derived from the ancient Egyptian language, and was at first used only of such spots in the Libyan Desert. In Algeria the French have formed artificial oases by sinking artesian wells. By employing irrigation, barley, rice, and other cereals may be cultivated.

Oates, **TITUS**, perjurer, was born at Oakham, Rutlandshire, England, in 1649. He was entered at Merchant Taylors' School, London, in 1665, but being soon afterwards expelled, his education was continued at Sedlescombe School, and Gonville and Caius College, and finally St. John's College, Cambridge. Taking holy orders (1673), he was sent to Dover prison for failure to pay the damages in which he was cast on a charge he had trumped up against a schoolmaster. He escaped from gaol and became chaplain on a king's ship, and was expelled the navy in a few months. He then contrived to be appointed chaplain to the Protestant dependents of the Duke of Norfolk at Arundel, a post in which he probably learned several secrets of use to him in his nefarious plots against the Catholics. He was soon unemployed again and (1676) along with Israel Tonge, a fanatical Anglican clergyman, produced inflammatory diatribes against the Jesuits. In 1677 he was rascal enough to enter the English Jesuit College at Valladolid, whence he was duly expelled, a like fate awaiting him at the seminary at St. Omer. In 1678 he set about piecing together the story of a plot to murder Charles II., in which he did not hesitate to implicate the queen and the Duke of York. The story hit off the mood of the people and, when the magistrate (Sir Edmund Berry Godfrey) before whom the depositions were taken was murdered, in October, 1678, and letters from the Duke of York's secretary were discovered asking for money from France, public indignation broke loose and, in spite of all efforts to do justice, many innocent people were put to death on the flimsiest evidence. In a couple of years the storm had exhausted itself and Oates retired into private life with a pension, having accomplished the judicial murder of thirty-five persons. He fell into further disrepute and in 1684 was accused of having called the Duke of York a traitor, fined in the enormous sum of £100,000 and thrown into prison in default of payment. On the accession of James II., Oates was tried for perjury, convicted, and sentenced to imprisonment for life, exposure in the pillory, and a flogging. After the Revolution he was released from gaol and actually received by William III., who granted him a pension of £5 a week. He did his best to aid William Fuller in another plot, which proved abortive, owing to his accomplice's want of nerve (1691). Afterwards Oates, who constantly appeared in canonicals, led a discreditable life of intrigue and low fraud and died in London on July 12th, 1705.

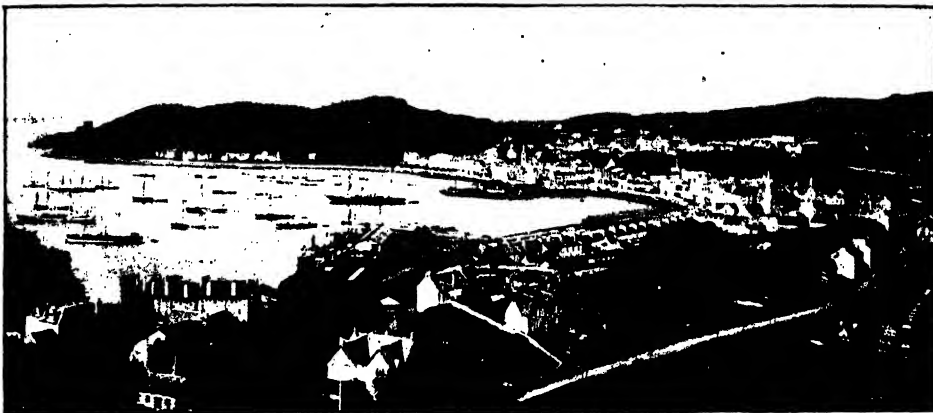
Oaths. An oath is a solemn asseveration made either by writing or word of mouth and attested by such solemnity as is binding on the conscience of the deponent. With Christians this solemnity is kissing the Holy Gospels; but in the case of persons holding conscientious views of the impropriety of oaths altogether, the Oaths Act of 1888 enacts that every person, on objecting to being sworn and stating as the ground of such objection either that he has no religious belief or that the taking of an oath is contrary to his religious beliefs, shall be permitted to make his solemn affirmation, instead of taking an oath, in all places and for all purposes where an oath is or shall be required by law and by the same Act. If an oath has been duly taken, the fact that the person taking it had no religious belief does not affect its validity. Besides this relaxation of the law on the subject, a statutory declaration has been substituted for an oath in non-litigious cases in many instances, but oaths when taken must be taken according to the form of each person's religious persuasion. A Jew is sworn, with covered head, on the Pentateuch, and so on. The Scottish form of holding up the right hand and reciting the oath after the judge is often preferred not by Scotsmen only, but by those who object to kiss copies of the New Testament which are apt to become insubstantial. Before an oath can be administered, it must be shown if any doubts exist that the witness is aware of the sanctity of the oath or, generally, that the Almighty will punish falsehood. Promissory oaths are those required to be taken by persons on their appointment to certain offices, as the oath of allegiance, of which the present form is:—"I, ———, do swear that I will be faithful, and bear true allegiance to His Majesty King Edward, his heirs and successors, according to law." The Parliamentary Oaths Act, 1866, requires the oath of allegiance to be taken by members of Parliament before sitting or voting. The administering of unlawful oaths is an offence against the Government and punishable by penal servitude. Taking a false oath is perjury. Children of twelve years of age and under are not sworn and the judge will not permit even older children to be sworn without first of all satisfying himself that they understand the nature of an oath. [AFFIDAVIT, AFFIRMATION, DECLARATION, PERJURY.]

Oats (*Avena sativa*), a well-known and valuable cereal grass, having its spikelets in a loose panicle and a long awn projecting from the dorsal rib of its outer glume. They are probably a variety of the wild *A. fatua*, are found in Swiss lake-dwellings of the Bronze Age, and were used as a bread-stuff by the ancient Germans, according to Pliny. Oats are largely grown in Scotland, Ireland, and the north of England where wheat will not flourish, 4 million acres, yielding from 38 to 40 bushels per acre, being generally under this crop in the United Kingdom, the acreage fluctuating less than that under wheat and barley. They are excellently adapted for cultivation in temperate climates, though not bearing a far northern region so well as barley, and deteriorating towards the south.

The United Kingdom imports annually over 14 million cwts. of the grain, chiefly from northern Europe. Oats are also largely grown in the northern United States. The straw is valuable for mixing with fodder, and the grain is the most valuable food for horses; but the meal is the staple food of man in many countries where wheat does not flourish. It is largely eaten as porridge, and, being richer in albuminoids, fat, sugar, and saline constituents than wheat, is of very high nutritive value. The whole grain, deprived of its husks, is known as groats or grits and is used for gruel. Dr. Johnson's definition of oats as "a grain which in England is generally given to horses, but in Scotland supports the people" is often supposed to illustrate his anti-Scots prejudice, but no doubt accurately reflected the custom of his time. Still the retort—"And where will you find such horses and such men?"—was not amiss.

and Government offices. The industries consist of textiles, soap, perfumery, chocolate, sugar and cochineal. Porfirio Diaz, President of Mexico, was born at Oaxaca in 1830. Pop. (1900), 35,049.

Ob, or **Obi**, a large river of Siberia, formed by the confluence of the Biya and the Katum, both of which rise in the Altai range. Leaving Chinese territory with a north-westerly course, it discharges its waters into the Gulf of Ob in the Arctic Ocean, draining an enormous area, and having a total length of 2,120 miles. Its chief tributaries are the Irtysh (2,520 miles long), Anui, Tcharysh, Tom, Tchulym, Ket, and Sova, and the towns of Barnaul, Kolyvan, Tomsk, and Naryn are on its banks. It is navigable as far as Biysk, a distance of 1,600 miles, and Nordenskiöld and, later and more thoroughly, Captain Wiggins proved that it is open to Western commerce by the sea.



OHAN.

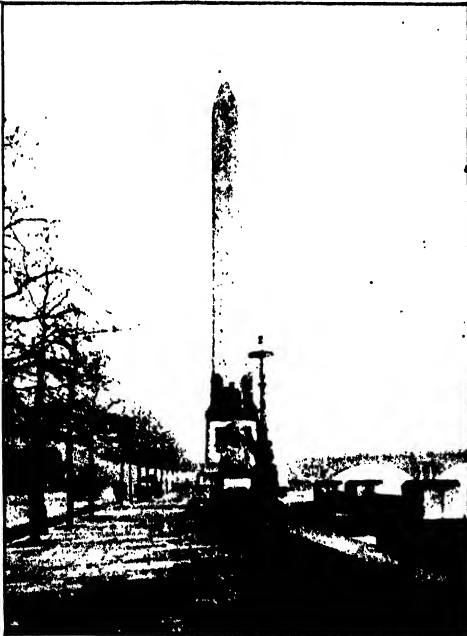
Oaxaca, a state of Mexico, bounded on the W. by Guerrero, on the N.W. by Puebla, on the N. by Vera Cruz, on the E. by Chiapas, and on the S. by the Pacific. It occupies the southern portion of the Isthmus of Tehuantepec and covers an area of 35,392 square miles. The Sierra Madre mountains traverse the state and, in Zempoaltepetl, reach a height of 11,140 feet. The chief rivers are the Rio Verde, Papaloapan, and San Juan. The climate is healthy and the soil fertile. The products include wheat, cotton, sugar-cane, tobacco, indigo, coffee, cacao, cochineal, timber, and dye-woods. Some live-stock are raised. The mineral wealth is great, comprising gold, silver, lead, copper, mercury, sulphur, iron and coal. The port of Salina Cruz is the Pacific terminus of the Tehuantepec Railway, and Puerto Angel is another harbour open to foreign and coasting trade. Pop. (1900), 948,643. **OAXACA**, the capital, 230 miles S.E. of Mexico, is beautifully situated, at an elevation of 5,000 feet above the sea, amidst gardens of tropical beauty and plantations of cochineal cactus. The principal buildings are the Cathedral, Episcopal Palace, Institute of Science and Art, Antiquarian Museum, City Hall,

Obadiah (*Abdias* "servant of Jehovah"), the fourth and briefest of the Minor Prophets. Nothing is known of his personal history, and attempts to identify him with others of his name have failed. He probably wrote in the 5th century B.C.

Oban, a seaport of Argyllshire, Scotland, capital of the West Highlands, 87 miles N.W. of Stirling by rail. In the tourist season there are steamers every week-day from Glasgow *via* the Crinan Canal, and from Inverness by the Caledonian Canal. There are also constant services to Tobermory (Mull), Portree (Skye) and Stornoway (Lewis). To its being thus the converging point of many steamer routes as well as to its easy access by rail, Oban owes its popular nickname of the "Charing Cross of the Highlands." It is delightfully situated on a bay, sheltered from the Atlantic by the island of Kerrera, and nestles at the base of beautifully wooded hills. At the northern end of the bay stands the hoary ivy-clad ruin of Dunolly Castle, the home of the MacDougalls of Lorne, and at the opposite end is the Pulpit Hill, so named from its frequent use as a preaching station in summer. A charming

modern improvement is the Marine Drive to the sands of Gavannan. Three miles and a half north-east of the town is the splendid relic of Dunstaffnage Castle, guarding Loch Etive, which contains several cannons of the Spanish Armada, but is more memorable still as the original resting-place of the Stone of Destiny before it was taken to Scone, whence it was removed in 1296 by Edward I. to Westminster Abbey, where it now lies beneath the Coronation Chair. On the front hills overlooking the town are the picturesque shell of a gigantic hydropathic establishment that was never finished and the curious Coliseum-like tower built by a native, partly to provide labour and partly to commemorate his family. The town contains a pro-Cathedral and many handsome hotels. Distilling is the chief industry, but the thorough and distributing trade is very important. Pop. (1901), 5374.

Obelisk (Greek, "pointed pillar," originally "spit"), a four-sided tapering column with an apex of pyramidal form. The ancient Egyptian obelisks were usually monoliths, consisting of a single piece of red granite or syenite. The proportions of these



CLEOPATRA'S NEEDLE, LONDON
(Photo: Cassell & Co.)

obelisks were always nearly the same; thus the thickness at the base was about one-tenth of the height, and the diminution in thickness between base and summit usually varied from one-fourth to one-third. The pyramidion or cap was commonly covered with bronze or gold and on the faces of the

shaft were carved inscriptions reciting the names and titles of kings. Obelisks are usually found in pairs in front of temples, and were probably erected in all cases to commemorate some particular event. Many of the Egyptian obelisks were removed to Rome, and the loftiest now existing, 108 feet in height, stands near the church of St. John Lateran. One of the two called Cleopatra's Needle was presented to Great Britain by Mehmet Ali in 1833; but its transport to England, at a cost of £10,000, borne by Sir Erasmus Wilson, did not take place till 1878. This obelisk, 68½ feet high, now stands on the Thames Embankment, London, an unfortunate situation, where the pillar, as Sir Frederick (afterwards Lord) Leighton said, was neither a centre-piece nor emphasised anything else, though flanked by two sphinxes that had turned their backs, the one upon the City and the other upon Westminster. The Luxor obelisk in Paris, on the other hand, occupies a magnificent site on the Place de la Concorde. Another Egyptian obelisk was conveyed to New York in 1880 and erected in Central Park.

Oberlin, JOHANN FRIEDRICH, philanthropist, was born at Strasburg on August 31st, 1740. He studied theology and, in 1766, became Protestant pastor at Waldbach, in the Steintal, or Ban de la Roche, the poorest part of Alsace. He set to work upon the moral and material improvement of his flock, making roads, teaching agricultural science, and fostering education, with such success that his little community won the respect alike of the revolutionary party and the monarchists. In his beneficent task he was aided by his housekeeper, Louise Scheppeler, a woman of remarkable character. Oberlin died on June 1st, 1826.

Oberon (from *Auberon*, *Alberon*, Old French forms of German *Atherich*), the king of fairy-land and the husband of Titania. These sovereigns and the story of their quarrel and reconciliation are best known to English readers from the *Midsummer Night's Dream*. Wieland found the subject for his best poem in the fairy tale (1780) and Weber afterwards used it for his well-known opera (1826).

Obesity, the term applied to the condition in which there is an undue accumulation of fat in the body. In some people there is a natural tendency, often hereditary, to corpulence, but in the majority of instances obesity is developed in persons of middle life who take little exercise and live well, and the condition is in them no doubt largely attributable to their habits. It is not usually recognised that with advancing years less food is required, and it often happens that those who lead the least energetic lives devote considerable attention to their diet. While, however, there can be no question that in the majority of cases corpulence is connected with over-indulgence in food, and is therefore most readily prevented by attention to this matter, in some instances anemia is associated with the deposit of fat, and it occasionally happens that in the more extreme type of obesity there are forms of degeneration, affecting mainly the circulatory organs, which render it inadvisable that any radical method of treatment should be adopted save

under good advice. Many plans of diet have been recommended in the treatment of obesity. They all agree in a considerable limitation of the amount of starchy and saccharine food prescribed—dry toast, biscuits, or rusks being recommended in place of ordinary bread, milk and sugar being prohibited altogether, and vegetables strictly limited in amount. By some much importance is attached to the strict limitation of the quality of liquid, particularly at meals; others recommend that plenty of tea, coffee, water, and the like should be consumed; but nearly all agree in the recognition of the advisability of taking but little alcohol. Most authorities recommend that meat should be taken in small quantities, and not more than once a day. While there are various views as to the quality of the food taken, there is a tolerably general consensus of opinion as to the quantity; and it is the height of folly for a patient to imagine that he can (by avoiding a few particular articles of diet) at one and the same time indulge largely in the pleasures of the table and grow thin. The famous formula of William Bunting (1797–1878), by means of which that gentleman was able to reduce his weight to the extent of nearly 3 stone in the course of a year, has been adopted by many people since his time. He recommended: for breakfast, some 6 or 7 oz. of solid food (meat, or fish and toast), and 9 oz. of liquid (tea or coffee, without milk or sugar); for dinner, 10 or 12 oz. of solid food, with 10 oz. of wine; for tea, 2 to 4 oz. of solid food (fruit and a rusk or two), with 9 oz. of tea; and for supper, 3 to 4 oz. of solid food, with 7 oz. of wine. This diet probably goes to an extreme in the exclusion of fat, and is somewhat liberal in the matter of alcohol, which might with advantage be replaced by cold water or a table mineral water. But in any case recourse to regular daily exercise, such as a "constitutional" indulged in systematically, should never be neglected. A daily walk or other judicious exercise will not only keep down flesh, but maintain one in physical fitness. The advantage of walking exercise is that it brings all the muscles into play without resort to the violent exertion required by so many games. It suits some people, but it is advisable that a severe regimen should only be adopted by the doctor's orders.

Object-Glass, that part of a microscope or telescope which forms the first image of the object viewed. When a single lens is used as a magnifying-glass it may be said to combine the functions of both object-glass and eye-piece, and in this case the image formed is erect and virtual. [LENS.] In the case of microscopes and telescopes, however, the object-glass forms an inverted real image in the instrument, this image being viewed by the eye-piece. In all good instruments the object-glass is an achromatic combination of lenses, generally of flint and crown glass.

Oblations, or OBVENTIONS, offerings or customary payments made to the minister of a church for marrying, burying, etc., and by way of "Easter offerings." Baptismal fees, once included in this tribute, were abolished by an Act passed in the reign of Queen Victoria.

Obligation, DAYS OF, holy days appointed by the Roman Catholic Church to be observed by the faithful, who are then required to attend mass and to do no servile work. In England and Wales the festivals of the Circumcision, Epiphany, Ascension, Corpus Christi, St. Peter and St. Paul, the Assumption, All Saints and Christmas are included, to which, in Scotland, St. Andrew's Day and, in Ireland, St. Patrick's Day and the festival of the Annunciation are added.

Oboe, or HAUTOBOY, a wind instrument of wood in which the tone is produced by means of a double reed of cane fastened by silk thread to a short metal staple. This staple is attached to the uppermost of the three joints of which the instrument, as now made, consists. The lowest joint has an outward curve like that of a bell. The compass is commonly from B below the staff to F in alt. The oboe has a rich, though small, tone, and is used in the orchestra to give the pitch (in the key of C) to other instruments.

Obolidae, a family of Brachiopoda, belonging to the order Inarticulata or Tretenterata, which lived only in Palæozoic times, where it ranged from the earliest to the Carboniferous ages. The family is allied to the living Lingula, but differs from the family of which that genus is the type, in the thickness of the margins of the shell-valves and the presence of a groove for the passage of the peduncle. The type-genus Obolus is Silurian.

O'Brien, WILLIAM SMITH, patriot, was born at Dromoland, County Clare, Ireland, on October 17th, 1803, and was educated at Harrow and Cambridge. He entered the House of Commons for Ennis in 1828, and sat for county Limerick from 1835 to 1848. Except as to the removal of the Catholic Disabilities, he did not at first sympathise with Daniel O'Connell, but after the Arms Act of 1843 he joined the Young Ireland party, and in 1847 started the Irish Confederation. He was arrested and tried for sedition in 1848, but not convicted. In July he started his "War Directory," and began actual hostilities at Ballingarry. A few troops soon dispersed his followers, and being again tried, he was condemned to death (October 9th), a sentence afterwards commuted to transportation for life. His plea that Government had no power to compel him to accept commutation of the sentence, for he said he preferred death to transportation, led to the immediate introduction of a Bill "to remove doubts concerning the transportation of offenders under judgment of death, to whom mercy may be extended in Ireland," which was passed within a few weeks, and on July 29th, 1849, O'Brien sailed for Tasmania. His health having given way, he was induced to accept a ticket-of-leave, and settled in Brussels (1854). Two years later he was unconditionally pardoned and returned to Ireland. He took no further part in active politics and died at Bangor, Wales, on June 18th, 1864, and was buried at Rathronan, county Limerick, six days afterwards.

Observatory, a place where astronomical observations are made. In the early ages astronomy

was chiefly a subject in which speculation held sway, and any observations of the heavens were of an extremely rough nature. About 300 B.C., however, an observatory was founded at Alexandria, and from this time onward astronomy became more truly a science, with a tendency towards founding its laws upon observed phenomena, though for many hundred years much unfounded theory still accompanied it. Hipparchus and Ptolemy made great strides in the science at the Alexandrian observatory, but after the 2nd Christian century the building does not seem to have been used. About the 9th century, observatories began to be built in Arabia and the East, and in the 15th century the first one in Europe was erected at Nuremberg. From this time observations grew much more exact, and Tycho Brahe in the 16th century, at his own observatory on the Swedish island of Hven in the Sound, started a series of consecutive records of the positions of different heavenly bodies. The utility of such records became at once apparent, and hence arose many national and public observatories, amongst the first being those of Paris and Greenwich. Such institutions are now to be found in almost every country of the world, among the latest being the Yerkes Observatory, Chicago, and the New Royal Observatory on Blackford Hill, Edinburgh, where the Earl of Crawford's magnificent appliances, removed from Dun Echt in Aberdeenshire, were installed. An enormous change has, of course, taken place in the instruments employed. The sextant and mural quadrant of Tycho Brahe have been succeeded by the transit instrument and the meridian circle, while the invention of the telescope added enormously to the field of observation. Errors in reading the instruments were lessened by the use of micrometers, and time was more accurately measured when chronometers were improved. Not only are observations made on the sun, planets, and stars, but meteorological and magnetic phenomena are also recorded in many observatories. The work to be done is therefore enormous, and so it is often found advisable to have different observatories devoted to different branches of the work, the largest being generally those maintained for pure astronomical observations. Dangers to the structures themselves have arisen from unsuspected quarters, and in 1906 Lord Kelvin and the Earl of Crawford were obliged publicly to invoke the assistance of Government to induce the London County Council to remove an electric power-station which threatened the utility (and therefore the existence) of the world-famous observatory in Greenwich. Nor was it without real concern that astronomers saw the closing in 1904, on the ground of economy, of the observatory on Ben Nevis. This institution had been erected and subsidised by private generosity since 1883, but further funds failing Government preferred to see it shut its doors rather than provide the few thousand pounds needed yearly to keep it going.

Obsidian, or VOLCANIC GLASS, said to have been named after its discoverer. Obsius (erroneously written Obsidius through a false reading), is a black, greenish-brown or grey glass, with a brilliant

vitreous lustre, and breaking, like artificial glass, with a conchoidal fracture. It often exhibits streakiness or fluxion-structure, and is full of microliths, and may be spherulitic or vesicular. It is found in Iceland, the Lipari Islands, Mexico, and elsewhere. In composition it is acidic, corresponding closely with sanidine felspar, and being, no doubt, formed by rapid cooling. The ancient Mexicans quarried it for arrow-heads and knives at the Cerro de las Navajas or "Hill of Knives." It is sometimes still cut and polished for ornamental purposes, as it was by the Greeks and Romans.

Obstetrics. This term, derived from the Latin *obstetriz*, a "midwife," literally "one who stands by," is applied to the science and art of the treatment of childbirth, and the abnormal conditions and diseases associated with the same. This branch of medical knowledge has undergone wonderful development in the last two centuries. The ancient physicians devoted, it is true, some attention to the subject, but their notions were crude, and their practice necessarily therefore far from perfect. Throughout the Middle Ages scarcely any advance was made; men were jealously precluded from all study of the problems involved, and ignorance and superstition reigned supreme. In the 17th century, however, a new science of obstetrics gradually came into being, and systematic study was devoted to the subject, with the result that it is now an everyday occurrence for the life of an infant or of a mother to be saved by the art of the obstetrician. In the large majority of cases labour is naturally performed without any artificial aid; but in some instances, whether it be from anomaly of the uterine contractions, from deformity of the pelvis, or from abnormality of the fœtus, the unaided natural forces are unequal to the task of delivering the child. An important advance was marked by the discovery of the forceps by the Chamberlens early in the 17th century, and the instrument has undergone improvement from time to time. By means of the traction exerted by the forceps it is often possible satisfactorily to terminate labour in cases which without the assistance of the instrument would be fraught with danger to the mother or child or both. Sometimes version, *i.e.* the bringing about of a change in the presentation of a child, requires to be effected; and in rare instances when it is impossible to deliver a living child, the operation of craniotomy is performed. The induction of premature labour is indicated in cases of extreme pelvic contraction. The expulsion of the after-birth is sometimes attended with difficulty, and disturbed contraction of the uterus after delivery may lead to bleeding (post-partum hæmorrhage, as it is called), which is one of the most urgent conditions that a surgeon can be called upon to deal with. The use of anesthetics, first employed in 1847 by Sir James Young Simpson, has greatly facilitated the performance of obstetric operations and materially diminished the difficulties in the treatment of labour. Puerperal fever, which in former days claimed many victims, is now, owing to the use of antiseptics and improvements in sanitation, comparatively rare.

Ocarina, a toy instrument of no musical value, made of pottery, in various sizes, with an internal cavity. It has a flute-like tone, and is played somewhat in the manner of a flageolet.

Occleve, THOMAS. [HOCCELEVE.]

Occlusion is the absorption of gases by metals, the phenomenon being specially remarkable in the case of platinum and palladium. A piece of red-hot platinum wire will dissolve about four times its volume of hydrogen, while warm palladium will hold as much as 648 volumes of that gas. If an electric current be sent through some slightly acidified water, and palladium used as the terminal at which the hydrogen would be evolved, the metal will occlude that gas until it is quite saturated with it, and will also swell in the process. Nickel under similar conditions will also absorb hydrogen. Meteoric iron is often found to contain a considerable volume of mixed gases, among which hydrogen is always found, it being often accompanied by nitrogen and carbon-monoxide.

Occlusion of a heavenly body is said to occur when it is hidden from our view by another body; thus the satellites of Jupiter are occulted by the planet when they pass behind it. Since the moon is so large an object in our sky, stars and planets are frequently hidden behind her disc, and such occultations are extremely interesting. They can only occur in a zone of the heavens about $10^{\circ} 18'$ wide, since the moon's orbit is inclined at an angle of $5^{\circ} 9'$ to the plane of the ecliptic. A star appears to meet the moon at her eastern edge, to disappear for a short time, and then to emerge at her western edge, and, if the moon be full, nothing very remarkable is observed in the phenomenon. When, however, the moon is younger, there is a part of her edge on the eastern side which we cannot see at all, since it is not illuminated by the sun, but which is, of course, quite as effectual in occulting a star as the bright part; the star then suddenly disappears from view when it passes behind this unseen obstacle, and the effect is rather that of the star having mysteriously "gone out."

Ocean, the body of saltwater enveloping the earth and covering almost three-fourths of its surface. Geographers recognise five distinct oceans—the Atlantic separating Europe and Africa from North and South America; the Pacific between the two Americas and Asia, Malaysia and Australasia; the Indian extending from Africa to Malaysia and Australia; the Arctic surrounding the North Pole, and the Antarctic, or Southern, south of 40° S. The main distinction between an ocean and a sea consists in the ocean's independence of the influence of land. The average depth of the ocean is somewhat in excess of 3,000 fathoms, but the deepest sounding on record is one of 5,269 fathoms obtained at a point east of the Ladrone Islands. The remotest part of the ocean from the nearest continent occurs in the South Pacific in 20° S., 130° W., but if islands be included no part of the ocean is farther than 1,300 miles from land (in the centre of the North Atlantic and at three points in

the East Pacific). The voyage of the British *Challenger* (1872-6) secured extremely important information as to the physical and chemical features, fauna, and marine deposits of the ocean, and the results of the German *Taldiria* (1898-9) exploration were of great value. The science specifically dealing with the phenomena of oceans and seas has been called Oceanography.

Oceania, or OCEANICA, a name occasionally applied to the fifth division of the globe, comprising the islands between the south-eastern shores of Asia and the western coast of South America. It has been sub-divided into Malaysia, Australasia, and Polynesia.

Ocellate, the small larval Medusæ or Jelly-fish, which are the young of the Zoophytes known as the Tubularia. They are provided with minute eye-specks, whereas the Medusæ, which are the larvæ of the allied group of the Campanulariæ, have auditory sacs and no eye-specks.

Ocellus, one of the simple eyes found in many of the Arthropoda. In this phylum the eyes occur in two distinct types. There is the compound eye, which contains a large number of distinct structures, each of which has all the elements of an eye; each element in this eye has its own lens, visual rods, retinal cells, etc.; in one eye there may be thousands of these structures grouped into a mass. In the second place, there is the ocellus, which consists of one such structure placed by itself. In some of the simplest insects, such as the Collembola, and in *Limulus*, it is the only optical organ present. In others, such as the larvæ of the May-flies (*Ephemeriæ*) and many Arachnida, both types of eye are present; others, such as the larvæ of the Dermaptera or Earwigs, have only the compound eye.

Ocelot (*Felis pardalis*), an American tiger-cat (or perhaps several races or varieties), arboreal in habit, preying chiefly on birds, and ranging from



OCELOT.

Texas to Patagonia. It has an average length of about 4 feet, of which the tail counts for one, and its fur is tawny or reddish-grey with black spots and blotches.

Ochils, a range of hills in the south-east of Perthshire, Scotland, dividing the county from Stirlingshire, Clackmannanshire and Kinross-shire. It extends from near the town of Stirling in a north-easterly direction almost to the Firth of Tay, and is about 24 miles long. It is largely used for pastoral purposes, and contains silver, copper, and iron ores. On an outlying spur, the Abbey Craig, between Stirling and Bridge of Allan stands the Wallace Monument. There are numerous beautiful glens, especially at Menstrie, Alva—called the Silver Glen because silver was once mined there—Tillicoultry and Dollar, with its notable ruin of Castle Campbell. The "hillfoot" towns have important manufactures, and Dollar has a famous Academy. The Devon, rising not far from Dunblane, flows eastward along the northern foot of the hills until it finds a way through the range and then flows along the southern base to the Forth at Cambus. The battle of Sheriffmuir was fought on the north-western flank in 1715. The highest points of the Ochils are Ben Cleuch (2,363 feet), King's Seat (2,111 feet), and Dunmyat (1,375 feet), a hill with a noble contour.

Ochino, BERNARDINO, Reformer, was born at Siena, Italy, in 1487. He became first an Observantine and then a Capuchin friar, rising in 1538 to be vicar-general of the order. Being suspected of heresy he was summoned to Rome (1542), but from information received on his way to the Eternal City he concluded it would be safer to journey northwards. He accordingly joined Calvin at Geneva, and afterwards formed a Protestant congregation at Augsburg (1545). In 1547 he came to England and was made a prebendary of Canterbury. About this time he composed *Tragedy*, in which Lucifer, angry at the spread of Christ's Kingdom, sets up the Pope as Anti-Christ, but is ultimately checkmated by the appearance of Henry VIII. and Edward VI. On the accession of Mary he fled to Zürich (1553), where he published the *Labyrinth*, assailing the Calvinistic doctrine of predestination and completing his severance from that party. Expelled from Switzerland, he took refuge in Poland for a time, till he was once more compelled to become a fugitive. He died on his wanderings, poor and alone, at Schlakau in Moravia in 1564.

Ochreate, in Botany, signifies furnished with a sheath formed by a stipule or the union of two stipules, through which the stem passes.

Ochres, natural pigments consisting of mixtures of the hydrated sesquioxides of iron with clays or earths principally composed of silica and alumina. The red and yellow ochres are the most important, being used alike by artists in oil and water colours and by house-painters. As a rule, they have much body and are very permanent, the natural ochres in these respects being decidedly preferable to those artificially prepared. Umber and sienna are varieties of ochre. Ochres occur in several English counties and are worked especially in Devonshire and Anglesey.

Ochterlony, SIR DAVID, conqueror of Nepal, was born at Boston, Mass., United States, on

February 12th, 1758, and became (1777) a cadet in the East India Company's service. After many years of service in the field and on the peace establishment, he took part under Lord Lake in the Mahratta War. After the battle of Delhi (1803) he became British resident at the Court of the Mogul till 1806, when he was appointed to command the fortress of Allahabad, and during his tenure of this post he had to hold the Sikhs in check. He was promoted colonel in 1812 and major-general in 1814. In 1814 he commanded a division in the beginning of the war against Nepal, and subsequently took entire charge of the operations, which he brought to a highly successful issue in 1816, and was rewarded by a baronetcy. He next assisted in breaking the Pindari power in Central India (1817-18) and in the pacification of Rajputana. In 1822 he was entrusted with the charge of affairs in Central India. His action in the matter of the succession to the throne of Bhartpur, in which he supported the boy raja, Balwant Singh, nephew of Ranjit Singh, was not approved by the Governor-General, Lord Amherst. Sir David accordingly resigned and died at Meerut of vexation of spirit on July 15th, 1825. He was a great diplomatist as well as a great soldier. Had his policy been endorsed the siege of Bhartpur by an army of 20,000 men would have been averted.

Ockham, or OCCAM, WILLIAM OF, the name, derived from his birthplace in Surrey, by which one of the leading schoolmen is known. Of his early life no facts have survived, except that he studied in the Franciscan house at Oxford. In 1322 he joined in the revolt against Pope John XXII. and after a brief imprisonment in Avignon, escaped in 1328, and ultimately reached Munich in 1330. Ockham was a Nominalist, and in his *Summa Logices* demolished Realism. He is best known popularly for the maxim (closely allied to Newton's First Rule of Philosophising), "Entia non sunt multiplicanda praeter necessitatem." He also insisted on the rights of secular princes as against the Papacy. He is often styled *Doctor Singularis* or *Invincibilis*. He died probably in 1349.

O'Connell, DANIEL, "The Liberator," was born at Carhen House, Cahirciveen, county Kerry, Ireland, on August 6th, 1775. He was educated (at the expense of his uncle, Maurice O'Connell of Darrynane, who adopted him), first at a small Catholic school at Cove (Queenstown), and then (1791-93) at the colleges of St. Omer and Douay. He left the latter in 1793 upon the outbreak of the French Revolution, of which he saw enough to fill him with horror. The following year found him a student of Lincoln's Inn, determined (as he himself expressed it) so to improve and enlarge his subordinate talents, as to secure for himself something more than a subordinate position in his profession. In 1798, having left London, he was called to the Irish Bar, at which he won a foremost position almost immediately, and became renowned for the sparkle and exuberance of his wit. In 1800 he was the principal speaker at a meeting of Catholics held to protest against the Union, and from this time he

gave himself up more and more to Irish politics. The ill-starred efforts of the United Irishmen had induced in his mind the conviction that secret and illegal methods were vain and dangerous and that "all work for Ireland must be done openly and above-board." It was with this conviction that he set himself to the organising of the vast movement which was to have so triumphant an issue in 1829. The ground of its operations having been thoroughly prepared, the Catholic Association came into being in May, 1823. From the first it was under the absolute control and direction of O'Connell. It was entirely supported by popular subscription, was officered largely by the priesthood, and embraced the whole of Catholic Ireland. Though suppressed in 1825 by Parliament, O'Connell started it again later in the same year under a very thin disguise. Some idea of its vastness may be got from the fact that on one day in January, 1828, as many as two thousand meetings were held in different parts of the country. O'Connell, emboldened by the success of the movement and availing himself of the anomaly which allowed of a Catholic's being returned as a member of a Parliament in which he could not sit, decided to stand for Clare upon the seat's becoming vacant in June, 1828. The election resulted in a decisive victory, and Catholic emancipation followed almost as a matter of course; a revision of Catholic disabilities was recommended in the King's Speech of February, 1829, and in the following April the Emancipation Bill became law. O'Connell's election having preceded the measure, he was denied the right to sit in Parliament without taking the obnoxious oath, until he had again presented himself to his constituency and been again returned. He was returned unopposed. This was in July, 1829, between which date and his death he represented successively Waterford, Kerry, Dublin, Kilkenny, Dublin again, and Cork. In August, 1826, he had founded the order of Liberators, whence his own *sobriquet*, whose objects were to conciliate Irishmen of all classes and creeds, to prevent disturbances at fairs, to disapprove of secret societies, to protect voters, especially the 40-shilling freeholders, and to promote electoral reform. In 1829 he had applied for silk and been refused. In 1831 he was the victim of an abortive prosecution. In Parliament, O'Connell sided with the Whigs until the outbreak of the tithe war, their earlier attitude in regard to which he strongly opposed; their later action in practically abolishing tithes and handing over the Irish Church surplus for secular use won them back his support. During the Reform movement he brought in a Bill for universal suffrage, triennial parliaments, and the ballot. In 1842 he was elected Lord Mayor of Dublin, the first Catholic to fill the post since the reign of James II. He first introduced the question of Repeal at the opening of Parliament in 1834, and challenged a division, which resulted in his defeat by 523 to 38 votes. In April, 1840, the National Repeal Association was founded, O'Connell relying on popular subscription for its support. This amounted in 1843—"the Repeal year," as O'Connell sanguinely called it—to nearly £50,000. In 1843 the Repeal agitation took the form of a series of enormous

meetings in and near Dublin, presided over by O'Connell. In October, Peel, determined to crush the movement, proclaimed a meeting which was to have been held at Clontarf. O'Connell decided that the meeting should be abandoned. He was arrested the following week on a charge of fomenting disaffection, was put upon his trial in January, 1844, was convicted, and sentenced to twelve months' imprisonment and a fine of £2,000, but the verdict, come to by a packed jury, was reversed by the House of Lords. With his submission in regard to the Clontarf meeting, O'Connell's influence, already weakening from several causes, was practically destroyed. He made his last speech



DANIEL O'CONNELL, M.P.

(After the drawing by J. Stewart.)

in Parliament on February 8th, 1847, and died at Genoa on the way to Rome on May 15th, in the same year. His heart, by his dying wish, was consigned to Rome, where it was laid in the church of St. Agatha. His body in the following August was removed to Dublin and buried with more than royal honours at Glasnevin. The network of political associations which O'Connell created throughout Ireland, and the admirable order which characterised the immense mass meetings of the Repeal agitation, gave proof of his powers of organisation and his control over his followers. Of his oratory, and especially of the beauty and power of his voice, the first Lord Lytton, Disraeli (Lord Beaconsfield), Lord Jeffrey, and Charles Dickens have left enthusiastic descriptions, and numberless instances have

been given of his wit, whether in Parliament, on public platforms, or in courts of law. Though not blameless in private life, he was a devoted and affectionate husband and father; and a pleasing picture of his relations to his wife and children is afforded by volumes of his *Correspondence*, published in 1890.

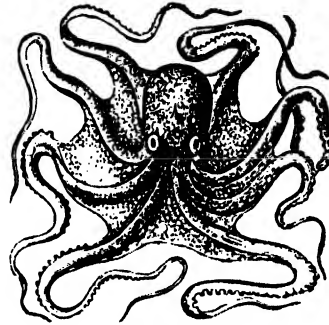
O'Connor, FEARGUS EDWARD, Chartist, was born at Connorville, county Cork, Ireland, on July 18th, 1794, and was educated at Portarlington and Trinity College, Dublin. He was called to the Irish Bar and soon became actively engaged in politics. In 1832 he was returned for Cork county as a repealer. After he broke with Daniel O'Connell, he joined the English Radicals, started at Leeds in 1837 the *Northern Star*, and became leader of the Chartists. Returned for Nottingham in 1847, he took a prominent part in the demonstration and monster petition of 1848. Failure unhinged his mind, and he died at Notting Hill, London, on August 30th, 1855.

Octavia, (1) daughter of Caius Octavius and sister of Augustus, was married early to Caius Marcellus, who died in 41 B.C. She then became the wife of Antony, thus reconciling him with her brother. Antony, however, yielding to the blandishments of Cleopatra, forsook his wife. In 32 he formally divorced her, but she brought up his children, even those by Cleopatra, and when she died in 11 B.C. she was buried with the highest honours of the State. (2) Daughter of the Emperor Claudius, who at the age of twelve was married to Nero.

October (Latin "eighth") was the eighth month of the ancient Roman year. It became the tenth month, and was given thirty-one days when the calendar was reformed by Julius Caesar. Its chief festivals are those of St. Luke (18th) and St. Simon and St. Jude (28th), whilst the evening of the 31st, or All Hallows' Eve, used to be recognised throughout Scotland as the occasion of popular merriment under the name of Halloween. One of Robert Burns's most humorous poems gives a brilliant and faithful account of the different ceremonies and customs generally observed.

Octopoda, an order of Cephalopoda, including the Octopus or Devil Fish (the "pieuvre" of Victor Hugo) and the Argonauta or Paper Nautilus. The nearest ally is the order Decapoda, from which it differs in the possession of eight instead of ten arms, in that these bear sessile and not stalked suckers, that the arms are connected at their lower ends by a thin membrane, and that the eyes have a sphincter-like lid. There are three families:—(1) the Cirrhotenthiidae, of which the type is the genus Cirrhotenthis, which is a small violet-coloured species from the coast of Greenland; (2) Philonaxidae or Argonautidae, including the Paper Nautilus; and (3) the Octopodidae, including the typical genus Octopus. The Octopoda have, as a rule, no shell; in most of the order this is represented only by a few internal, small, calcareous rods. In Argonauta, however, two of the arms are expanded at

their ends, and the flat plate-like membranes thus formed are folded back, and secrete a shell over the hinder part of the body. This is present, however, only in the females. In most of the Octopods one of the eight arms in the males is specialised to serve as a reproductive organ; it is usually separated from the male during copulation, and when discovered by the Italian naturalist, Chiaje, was regarded as a parasitic worm and described under the name of *Trichocephalus acetabularis*. Aristotle, however, who described the Argonaut, seemed to have understood its proper function. The Octopods



THE OCTOPUS

are all marine; they either live in holes under rocks, as e.g. the ordinary Octopus, or swim on the surface often far from land. The only fossil representatives of the order are some shells of the Argonauta from the Cainozoic deposits. The Octopus is not uncommon round the English coast and in the Channel Islands.

Octroi, a French word derived from the Latin *auctoritas* ("authority"), originally denoted any grant or privilege authorised by Government. It afterwards came to be used only of the taxes levied in France and other countries on goods carried within the gates of towns. The injurious effect of a tax of this nature on the internal trade of a country is obvious. The French octrois were abolished during the Revolution, but were again introduced in 1798.

Od, a supposed new force in Nature, which Baron von Reichenbach (1788-1869), a German naturalist, believed he had discovered in the course of his inquiries into animal magnetism. He thought it connected with vital and magnetic phenomena, and was exhibited by crystals, the poles of magnets, various chemical processes, and extremely sensitive persons, who poured it forth at their finger-tips. It thus occupied an intermediate position between electricity, magnetism, heat, and light. Though held to account for the phenomena of mesmerism and animal magnetism, it has no scientific basis.

Ode (Greek *ōdē*, "chant") denotes literally any poem arranged to be sung to an instrumental

accompaniment. Poems of this description were developed from the regular distich, the simplest form of verse, by Archilochus, who introduced the epode, and Alcan, who united a series of such movements in one complex whole. Out of this class of lyrics grew the two different kinds of "ode," in the narrower meaning of the term. The type perfected by the Lesbian and Æolian poets—Sappho, Alcaeus, and Anacreon—is best known through the imitations of Horace, and is therefore called "Horatian." It was susceptible of much manipulation in the arrangement of its parts, yet it was always marked by a certain slightness of form and simplicity of construction as compared with the more elaborate Pindaric ode. The latter was the result of the modifications introduced into Alcan's ode by Stesichorus, Simonides, and Pindar. Stesichorus invented a threefold movement, the *strophe* being answered by the *antistrophe*, whilst both were in a manner repeated in the final *epode*. This form was adapted by Simonides to the requirements of Dorian music, and reached its full development in Pindar's *Epinikia*, odes of victory sung at the great national games. The modern ode has been defined as "any strain of enthusiastic and exalted lyrical verse, directed to a fixed purpose, and dealing progressively with one dignified theme." Amongst these the English certainly hold the highest rank. They fall naturally into two divisions: those which follow the Horatian type and those modelled, whether intelligently or through some mistaken notion, on the Pindaric. To the former class belong two of the earliest and most beautiful of English odes: Spenser's *Epithalamium*, and Milton's ode, *On the Morning of Christ's Nativity*. A new form—purely artificial in its apparent freedom—was unfortunately given to the ode through the influence of Cowley, who, failing to perceive the principle which regulated the construction of the Pindaric ode, imagined that it left the poet at liberty to follow his own fancy without any regard to rhythmic or other considerations. The precept and example of Congreve, who grasped the sequence of strophe, antistrophe, and epode, failed to stem the current fashion, which had even influenced Dryden; but his views were afterwards carried out by Gray in his *Progress of Poesy* (1754) and *The Bard* (1756), Pindaric odes in a much truer sense than the spurious imitations of Cowley and his followers. Shortly before, in 1747, Collins had published the volume containing his ode *To Evening*, *The Passions*, and other excellent examples of the Æolian type. The four great poets of the romantic revival—Wordsworth, Coleridge, Shelley, and Keats—all produced odes of the highest beauty, which, in conformity with the teaching of the school, completely set aside all conventional rules. The finest odes by later poets are Tennyson's *On the Death of the Duke of Wellington*, Coventry Patmore's *To the Unknown Eros*, and Swinburne's *To Victor Hugo in Exile*.

Odense, a seaport on the north coast of the Isle of Fünen, Denmark, 80 miles W. of Copenhagen. Among the principal structures are the

cathedral of St. Canute, the Danish patron-saint, who lies under its altar, dating from 1081-93, and rebuilt in the 13th century; Our Lady's Church, restored in 1864; the castle erected by Frederick IV.; the Franciscan Hospital, presented in 1539 by Christian III.; the town hall; the museum; and the episcopal library. The industries include cloth, glass, sugar, leather, tobacco, matches, and chemicals, besides iron-founding, brewing, and distilling. The shipping is considerable. Hans Christian Andersen was a native. Pop. (1901), 40,138.

Oder, THE, a river of Germany, rising in the Odergebirge, Moravia, 14 miles E. of Olmütz, and emptying itself into the Baltic Sea at Swinemünde after a course of 560 miles. It has a drainage area of 43,300 square miles. Passing with a sharp fall through Moravia, and dividing Prussian from Austrian Silesia, it meanders for 490 miles, through Silesia, Brandenburg, and Pomerania, in a sluggish and shallow stream, till it loses itself in the lagoon known as the Stettiner Haff, thence finding its way to the sea by three channels, of which the Swine is the chief. The principal tributaries are the Oppa, the two Neisses, the Katzbach, and the Bober on the left, and the Malapane, Bartsch, and Warthe on the right. Besides Swinemünde the towns of Ratibor, Oppeln, Brieg, Breslau, Glogau, Frankfort, Cüstrin, and Stettin are on its banks. Navigable for sea-going craft as far as Stettin, it is with some difficulty kept open for barges and river-steamers up to Oderberg, and much traffic passes up and down. Canals connect it with the Havel, the Spree, and other rivers.

Odessa, a seaport of Russia, at the north-western corner of the Black Sea, the fourth most populous city of the empire. It is the chief town of the government of Kherson and is situated about midway between the mouths of the Dnieper and the Dniester. The bay on which it stands is exposed to the violent east winds, during the prevalence of which ships find shelter in three capacious harbours. The existing town dates only from 1791, when Russia definitely took over the place, and to the Duc de Richelieu, an early governor, much of its advancement is due. It is now the capital of Novorossia, has a fine cathedral (1849), a palace and public park, and an excellent university. Several learned and scientific societies of the first rank have their headquarters in the city. As an outlet for the grain-producing districts of South Russia Odessa does an enormous export trade, the granaries being immense structures, some of almost palatial aspect. The other exports are sugar, wool, fish, iron and steel goods, cotton, tobacco, spirits, furniture and small arms. The industries comprise matches, sugar, leather, textiles, soap, chemicals, and starch, besides mills and iron works. Owing to surrounding lagoons, the climate is unhealthy. The city was bombarded during the Crimean war, but has since been protected by coast batteries. After the Russo-Japanese war social unrest and strikes in 1905 and 1906 were suppressed by severe military measures; and, owing to the large number of Jews in the community, there are

periodical outbursts of Jew-baiting on a more or less extensive scale. Pop. (1901), 450,218.

Odin, the Scandinavian name for the deity known among Teutonic races as Woden or Wotan (hence Wednesday is Woden's day). The son of Bestla and Bor, the husband of Freya or Frigga, and the father of Thor and Baldur, he typifies manly virtues, such as courage and wisdom, but not without a mixture of craft. He is often described as one-eyed, riding on an eight-legged horse (Sleipnir). Though supreme among the gods, he is not immortal, and when the Æsir (and, with them, the world) are destroyed, he will perish under the fangs of Fenrir, the wolf, the offspring of Asa-Loki.

Odoacer, or ODOVACAR, the son of a Hun or possibly a Goth, was born in the district of the middle Danube about A.D. 434, and entered the imperial service of Rome about 464. In 476, having attained high rank, he headed his countrymen in a revolt against the boy Augustulus and became emperor, though recognised only as patrician. Fear of his greatness probably induced Zeno, the Eastern Emperor, to direct against him the Ostrogothic hordes under Theodoric, who defeated him in several battles (489-491), besieged him in Ravenna and, under the pretence of a peaceful meeting, murdered him in cold blood (February 25th, 493), and exterminated his family.

Odonata, the order of insects which includes the Dragon-flies.

O'Donnell, HENRY JOSEPH, field marshal, was born in 1769 in Spain and, entering the army, had attained the rank of general when, in 1810, he received a command in Catalonia. He distinguished himself in the Peninsular War, and became a field marshal and Count La Bisbal. Under Ferdinand VII. he was appointed Captain-General of Andalusia and, in 1818, Governor of Cadiz. His conduct during the French invasion of 1823, however, brought him under suspicion, and he fled to Limoges, in France, and died at Montpellier on May 17th, 1831.

O'Donnell, LEOPOLD, Duke of Tetuan, second son of the preceding, was born at Santa Cruz, Teneriffe, on January 9th, 1809. At the outset of his military career he attached himself to Queen Christina, whom he accompanied in her exile in France. In 1843 he succeeded in ousting Espartero from power, and was rewarded by the governorship of Cuba (1844). He was recalled four years later and entered the Senate, and was made inspector-general of infantry in 1851. In 1854 he was Minister for War under Espartero, but plotted against him, and in 1856 was for a few months Prime Minister. He returned to power in 1858, headed the Morocco expedition (1859), and was created Duke of Tetuan. From March, 1863, to June, 1865, he was out of office; but his final term of rule was of short duration, and not long after his defeat by Narvaez, he died at Bayonne, in France, on November 5th, 1867.

Odontoglossum, a large genus of orchids, mostly natives of cool, elevated localities from Mexico to Venezuela and Peru, many of which are in cultivation. Some are terrestrial, and others epiphytes. Their large and brilliantly-coloured flowers have spreading sepals divided to their bases and nearly equal-sized petals.

Odontopteryx, a fossil bird, described by Sir Richard Owen, from the London Clay of the Isle of Sheppey, with serrated mandibles, probably a fish-eater, like the Merganser.

Odontornithes, the name proposed by Professor O. C. Marsh for an extinct order of birds, including the remarkable genera *Ichthyornis* and *Hesperornis* from the Cretaceous rocks of Kansas, both of which have true teeth. *Ichthyornis* had powerful wings, a well-developed keel to its breast-bone, biconcave vertebrae, and its teeth in distinct sockets, whilst *Hesperornis* has the merest rudiment of a wing, a flat breast-bone, saddle-shaped vertebrae, and its teeth in a common alveolar groove. Professor Alfred Newton consequently prefers to break up this proposed order, relegating the former genus to the order *Carinatae* and the latter to the *Ratitae*. [BIRDS.]

Ecclampadius, really JOHN HEUSSGEN or HAUSSCHER (the German patronymic being Hellenised), reformer, was born at Weinsberg, in Württemberg, in 1482. Trained at Heidelberg, he became a pastor at Basle in 1515, and at once joined the party of reform. In 1518 he published his *Greek Grammar* and, in the same year, was transferred to Augsburg. He entered a convent for a time, but, finding no peace of mind there, went back in 1522 to Basle, where he openly preached the Reformed doctrine, following Zwingli rather than Luther. He died at Basle on November 24th, 1531. He was the friend of Erasmus, Hedio, Reuchlin, and other scholars, and was the author of commentaries on the Prophets and Genesis, and a treatise, *De Ritu Paschali*.

Edema is derived from a Greek word signifying "a swelling," and is applied to the condition in which there is an effusion of serous fluid into the connective tissue spaces beneath the skin; e.g. oedema of the eyelids, or oedema of a limb due to the blocking of a vein. Oedema of the lungs is the condition in which the passages of the lung become choked by the exudation of serous fluid, and *oedema glottidis* is the expression used to designate the effusion of fluid into the tissues beneath the mucous membrane of the glottis, leading to swelling and to obstruction of the passage of air through that aperture. [DROPSY.]

Oedenburg (Hungarian, SOPRON), a town of Hungary, charmingly situated within 3 miles of Neusiedler See, 36 miles S.S.E. of Vienna. The Roman station of Sopronium, it was created a royal free city in the 11th century for services rendered to the King of Hungary against the Bulgarians. At the Diet of 1681 the Protestants presented the Oedenburg Articles praying for the restoration of

their churches and estates. The principal industries are the making of crystallised fruit (a famous speciality), beet sugar, starch, soap, and clothing, besides a wine little inferior to Tokay. The markets for cattle and agricultural produce are important. Pop. (1900), 33,478.

Œdipus, a legendary King of Thebes, son of Laius and Jocasta, was exposed at his birth, owing to a prophecy that he would cause his father's death. Saved by a shepherd, the boy was brought up at the court of Polybus of Corinth in ignorance of his origin. Meeting Laius in a narrow road, he quarrelled with and slew him. Then, solving the riddle of the Sphinx, he married his own mother. When the facts were ascertained, the wretched king—victim of remorseless unbending Fate—put out his eyes and, wandering into exile under the devoted care of his daughters, died at Colonus. The story is referred to in the *Odyssey*, and was the subject of Sophocles' great tragedies *Œdipus Tyrannus* and *Œdipus Colonus*.

Œhlenschläger, ADAM GOTTLÖB, poet and playwright, was born at Copenhagen on November 14th, 1779. His education was slight and haphazard and, at the age of 18, he took to the stage, for which he had no gift. In 1800 he attended Copenhagen University, but his studies were cut short by Nelson's bombardment of the city in 1801, the attack, however, inspiring a promising first dramatic sketch by his hand. Coming under the influence of the Norwegian philosopher Henrik Steffens and the revival of Romance, he produced (1802) his fine poem of *Guldthornene*. This was followed by *Aladdin's Lampe* and other poems. His genius was recognised and a Crown grant enabled him to visit Halle, where he again met Steffens (1805), Berlin, where he met Humboldt and Fichte (1805), Weimar, where he met Goethe (1806), Dresden, where he met Tieck (1806), Paris, where he remained for a year and a half, Switzerland, where he met Madame de Staël at Coppet (1808), and Rome, where he met his compatriot Thorwaldsen. During this period he produced his masterpieces *Hakon Jarl* (1805), *Halldur hin Gode*, *Palnatoke* (1807), and *Axel og Valborg* (1808). In 1810 he returned to Copenhagen to fill the chair of Æsthetics in the University. His literary fecundity was as marked as ever, but the quality of his work showed the effects of over-production. Of his later period *Helge* (1814) and *Dina* (1842) alone were fully worthy of him. When in Sweden in 1829 he was publicly crowned with laurel in Lund Cathedral as "Scandinavian King of Song." On his seventy-first birthday a public festival was held in his honour, and he was decorated by Frederick VII. He died on January 20th, 1850, and was buried in the cemetery of Frederiksberg, a suburb of Copenhagen.

Œneis, a genus of butterflies, belonging to the family Nymphalidæ, and including many Alpine and Arctic species.

Œnothëra, a genus of the calycifloral order Onagraceæ, mostly herbaceous and natives of

America. They have crowded radical leaves, scattered cauline ones, large self-coloured flowers opening usually in the evening, a four-cleft, reflexed, deciduous calyx, and numerous seeds. The best-known is the so-called Evening Primrose (*Œ. biennis*), with pale yellow flowers, which often escapes from gardens in England (where it and other species are cultivated), and is naturalised. Its root is edible and sometimes forms an ingredient of salads and soups, or may be used as a vegetable. Taken after dinner it is said to flavour wine or create a desire for it, a property probably hinted at in the scientific name of the genus (Greek, *oinos*, "wine"; *thêras*, "catcher").

Oersted, HANS CHRISTIAN, physicist, was born at Rudkjøbing, in the island of Langeland, Denmark, on the 14th of August, 1777, and was educated at the University of Copenhagen. After a few years spent in travel he was appointed in 1806 Professor of Physics in Copenhagen University. Two years later he was elected a member of the Danish Royal Society of Science, of which, in 1815, he became perpetual secretary. In 1812 appeared his suggestive *Ansicht der chemischen Naturgesetze*, and in 1819 his *Experimenta circa efficaciam conflictus electrici in aciem magneticam*, in which he propounded his epoch-making discovery of electromagnetism, a discovery for which he received the Copley medal of the Royal Society and an award from the French Institute. He next engaged in experiments as to the compressibility of water, and a year or two later discovered the metal aluminium. In 1828 he was made Privy Councillor, and in 1829 was placed at the head of the Polytechnic School in Copenhagen, the founding of which was largely due to his efforts. In 1842 he was elected corresponding member of the Academy of Sciences in Paris. His skill in popularising science led to the publication in 1849-50 of his lectures in a work entitled *Aanden i Naturen* ("The Soul in Nature"). He died at Copenhagen on March 9th, 1851.

Oersted, ANDERS SANDØE, lawyer and statesman, brother of the preceding, was born at Rudkjøbing, Langeland, Denmark, on December 21st, 1778, and educated at Copenhagen University. He adopted the legal profession, which he afterwards combined with politics, becoming in 1853 Prime Minister of Denmark. His reactionary tendencies led to his impeachment and, though acquitted (1856), he took no further part in public affairs. Among his writings were *Evnomia* (1815-22), *Manuel de Jurisprudence danoise et norvégienne* (1822-35), and *Histoire de ma vie et de mon temps* (1851-57). He died on the 1st of May, 1860.

Oesel, an island stretching across the mouth of the Gulf of Riga, in the Baltic Sea, and included within the Russian province of Livonia. It has an area of 1,010 square miles, being about 45 miles long by 30 miles broad, with a bold limestone coast and an undulating, well-watered, and well-wooded interior. Grain, flax, hemp, potatoes, and timber are the chief products, and the island is famous for a breed of small ponies. Belonging at first to the Teutonic Knights, it was occupied successively by

Danes and Swedes, and ceded finally to Russia in 1721. The population is almost entirely Lutheran, and the capital, Arensburg (4621), on the south coast, is a favourite seaside resort in summer. Pop. of Oesel, estimated at 50,000.

Oesophagus, or **GULLET**, connects the lower part of the pharynx with the cardiac orifice of the stomach. It is about 9 inches long, and is lined internally with mucous membrane, beneath which is the submucous tissue containing glands, and external to this is a muscular coat. The muscles of the oesophagus by their wave-like contraction convey the bolus of food received from the pharynx into the stomach.

Offa's Dyke, a great entrenchment, 100 miles long, constructed by Offa, King of Mercia, about A.D. 780. Starting at Newmarket, in Flintshire, near the mouth of the River Dee, it traverses the counties of Flint, Denbigh, Salop, Radnor, Hereford, and Monmouth, ending at Beachley, where the Wye joins the Severn. The earthwork was made either as a boundary to separate the Principality from England or as a rampart against the Welsh. Though much of it has disappeared, it is still traceable throughout most of its extent.

Offenbach, a town of Hesse-Darmstadt, Germany, on the Main, 5 miles S.E. of Frankfurt. The chief buildings are the old castle of the Imperial Counts of Isenburg, their modern palace, and the town hall. The manufactures include carriages, machinery, hardware, chemicals, soap, candles, shoes, hats, paper, type and textiles, but the industrial speciality are leather fancy goods, such as albums, pocket books, and portfolios. The prosperity of the town and the varied character of its interests are due to the fact that it offered an asylum to the Huguenots after the revocation of the Edict of Nantes in 1685. Pop. (1900), 50,468.

Offenbach, **JACQUES**, composer of *opéra bouffe*, was born, of Jewish parents, at Cologne, Germany, on June 21st, 1819, and studied music at the Paris Conservatoire. In 1848 he made a hit as a composer with a song introduced into Musset's *Le Chandelier*. His first operatic work, *Pepito*, appeared in 1853, and during the next twenty-seven years he produced sixty-nine operas. He caught the taste of the Parisian public, and may almost be said to have founded a school. His most popular efforts were *Ophtie aux Enfers* (1858), *La Belle Héline* (1864), *Barbe Bleue* (1866), *La Grande Duchesse de Gerolstein* (1867), *Fert-Fert* (1869), *Madame Favart* (1879), and *Geneviève de Brabant*. He died in Paris on October 5th, 1880.

Offertory, that part of the Eucharist in which the laity in virtue of their priesthood make their offerings to God. The bread and the wine offered to the Father are called the Oblations; in the alms an offering is made to the Son for the use of the Church and her ministers, and for the relief of the poor, as enjoined by St. Paul (1. Cor. xvi. 2). The word *offertorium* ("offering") is also applied to the anthem sung during the collection of the alms.

Og, King of Bashan and, with Sihon, of the Amorites, was defeated by the Israelites at Edrei, which city and Ashtaroth were his capitals. He is said to have been of enormous stature, his bed being nine cubits long.

Ogee, a moulding consisting of a round or convex member, followed by a hollow or concave one. Accordingly the word is said to be an attempt to describe the nature of the double curve, which is part of O and part of G (*gee*). In Early English the double curve was full and round, in the Perpendicular it was shallow. An ogee-arch is a pointed arch, the sides of which are two ogees which unite to form the apex. On the other hand, the French *ogive* denotes any kind of pointed arch.

Ogham, or **OGAM**, the secret manner of writing employed by the ancient Irish, the name given to the writings and inscriptions formerly in use among the Celtic race in England, Scotland, Ireland, and Wales.

Ogham inscriptions, like the Runic writings of the Teutonic nations, were inscribed on stone and wood, although no Ogham inscriptions on wood now exist. The alphabet consists of twenty letters, formed by straight and slanting strokes carved on the edges of large stones which formed the stem. Doubtless at an early period in Irish history there must also have been an Ogham dialect, though of this we have but little proof. The first monument was found by an eminent antiquary and botanist near Dingle, Co. Kerry, Ireland, in 1707, and thinking the inscription was similar to a secret writing known to have existed in Ireland, he made a copy of it. Another stone was found at St. Dogmael's, near Cardigan, in Wales, and after this several archaeologists and antiquaries studied the inscriptions, and the secret alphabet was found out and read as follows from the most ancient of the Ogham monuments (Fig. 1):—



FIG. 1.—OGHAM ALPHABET.

Ogham existed in Ireland long before the Christian era, for Roderic O'Flaherty in his *Ogygia* states that Connor MacNessa, who reigned about A.D. 48, had the laws of the country written in Ogham. The same author asserts that in the reign of Feradach (A.D. 90) there was a great literary dispute between the Ogham writers and the Druids. It has been suggested that the introduction of Ogham was due to the Romans, but Ogham writings have never been found outside the British Isles. Moreover, the fact that Roman capital lettering is sometimes found in the later Ogham inscriptions points clearly to Ogham being purely of Celtic origin. And if further evidence were needed against the Roman origin theory, it is to be found in the fact that the majority of Ogham monuments are in Ireland, to which country the Romans never penetrated.

Ireland. All the Ogham inscriptions so far discovered number some 250, most of which merely consist of epitaphs. Of these no fewer than 200 are in Ireland, chiefly in the southern counties, Kerry, Cork, Waterford, and Kilkenny. It is as yet an open question whether Ogham writing originated in Ireland and spread thence to Wales, or *vice versa*. In all probability Ireland is the mother country of the writing, or we should find Oghams in greater abundance in Wales. It has practically been decided that Ogham existed in Ireland before the Christian era, while it is certain that the Gauls, or at least the Druidical Gauls, had a secret writing before Cæsar's time, which writing was used until the 4th and 5th centuries, when the Roman alphabet came into use. St. Patrick, when he began to teach Christianity in Ireland, is said to have destroyed the idolatrous books of the Irish. Possibly these books were written in Ogham. In any case this goes some way to prove that the Irish had some kind of writing in the Pagan days, and it seems reasonable to assume this to have been Ogham. The Irish historian of the 10th century, Eochaidh O'Flinn, informs us that Dagda, one of the legendary Tuath-de-Danand kings, who invaded Ireland in the earliest times, had a brother named Ogma who invented Ogham, and this legend gained general credence among the Irish until as late as the 18th century. In Kerry the most remarkable monument is known as the Trabeg stone. This lies on the shore of a small inlet in the bay of Dingle, the water at high tide washing over the stone. It is a monolith of hard red sandstone measuring 7 ft. 9 in. long, 1 ft. 9 in. by 1 ft. 2 in. at the bottom, and 1 ft. 2 in. by 12 in. at the top. It is one of the most carefully cut Oghams that have been found, but the cross was probably inscribed at a much later date and after the Christian era, while as to the meaning of the secret symbols, authorities disagree. Another remarkable stone in Kerry, called the Clenfuis, lies in a field in the parish of Annagh, near Tralee. Like the Trabeg stone, it is of hard red sandstone, and its characters, though much smaller, are distinctly formed and in good preservation. After it was found and the writing deciphered, it was thought to read from one side of the stone thus:—"This is the warrior Cuaf, my grief: this is the warrior king"; but it afterwards was found by another authority to read from the opposite side in a sense entirely different. Other Oghams have been found at Dunmore, Kilnaughtin, Brandon Mountain, Fort William (where several were found in a cave dwelling), and in other parts of the country. Those in Cork, Waterford, Kilkenny and elsewhere are much the same as those of Kerry. In the case of Oghams that have been found near ancient ruined churches and burial grounds, most of them are in memory of some saint or person of rank, and sometimes accompanied by Roman letters and bearing a cross, which seems to point to the fact of their being inscribed after the introduction of Christianity.

Wales. The Welsh Oghams exist chiefly in Mid-Wales and number about eighteen. These are more often accompanied by Roman epitaphs (Fig. 2).

From this it is supposed that the Ogham monuments of the Principality do not date before the first Roman occupation of Wales, while there are good grounds for believing that Ogham was used amongst the Welsh as late as the 5th century. From this it has with reason been inferred that its introduction was due to the Irish colonists who settled in Mid-Wales. The best-known Welsh monument is that at St. Dogmael's, found in an old abbey. It is of porphyritic greenstone and measures 7 ft. in length, 9 in. to 12 in. in breadth, and about 7 in. thick. When found, the surface was quite smooth and covered with lichen. After this had been removed it was noticed to have once been highly polished, and the Ogham inscription when deciphered was found to form Latin words. In the churchyard at Bridwell, Pembrokeshire, dating from the 15th century, is a monumental stone bearing an inscription in Ogham. It may



FIG. 2.—OGHAM INSCRIPTION WITH NAME "MACUTRENU" IN OGHAM CHARACTERS, AND LATIN LETTERS (CAPEL CRAI, DEFWYNNOCK, BRECON, 1870), BRITISH MUSEUM.

have been a stone moved from some other spot with the inscription already on it, but this seems doubtful, for upon its re-erection it is probable that a further inscription in the Welsh would have been added. Other stones no less interesting have been found at Kenfig, Glamorganshire; Crickhowell, Breconshire; Clydai, Pembrokeshire; and other places.

Scotland. The Oghams of Scotland differ greatly from those found in other parts of the British Isles, but nevertheless they are of the same essential type. They belong to what has been termed the "scholastic variety" in which the notch is unknown, the digit serving for both the vowel and consonant. Scottish Oghams number about ten, and probably began to be erected after the invasion of North Britain by the Scots of Ireland about the 3rd century. Ogham monoliths have never been found south of the Firth of Forth, the country into which the dominant Scots drove the weaker Picts, while they have been found as far north as the Shetland and Orkney Isles.

The most important Ogham, and that around which most discussion has centred, is the Newton stone discovered in a fir plantation near Garioch, Aberdeenshire, in 1804. This monolith is of

unhewn quartzose gneiss, is 6 ft. high and about 2 ft. in breadth. The inscription is in two distinct writings, one consisting of Ogham and the other of Greek resembling those letters used in the early Irish MSS. of the 5th century. About this stone great controversy has raged, but all authorities agree that reference is made on it to gods of other lands such as Zeus of the Greeks, Osiris of the Egyptians, Adad the sun god, and possibly to Buddha, but this is uncertain, as the characters might be mis-spelt and allude to Buto the Egyptian goddess of the Nile Delta. This is not at all curious or impossible to understand. It may have been made long after the Roman occupation of Britain, and when Christianity was fast spreading over the island. The theory of some of the best authorities on the subject is that the Newton inscription was written by one who had been taught the names of the various deities, and afterwards getting tired of the continual wars and strife in Britain waged at that time as far north as the Firth of Forth, fled to Scotland, finally settling in Aberdeenshire, and having vague and mixed ideas of Christianity, carved on the Newton stone these references to ancient deities. The Ogham on the stone is so badly inscribed that it is almost valueless, and was evidently not performed by the same craftsman, the Greek letters being clearly cut with what might be a stone-mason's chisel, which suggests that the Ogham part of the inscription must have antedated the other. Other well-known Oghams of Scotland are the Logbie stone in Aberdeenshire, the Scoonie stone in Fifeshire, the Golspie stone in Sutherland, the Bressay stone in the Shetlands and the Burrian in the Orkneys.

England. The Ogham stones of England number four. Three of these have been found in Devonshire—one at Fardell and two at Buckland Monachorum—while the fourth was found at a small farm near Camelford in Cornwall. These stones are exactly the same as those found in Ireland and Wales. The principal one, the Fardell stone, when found was being used as a foot-stone across a brook, but is now at the British Museum.

The origin of Ogham is thus shown to be enveloped in mystery, but on three points specialists agree :—

- (1) That Oghams are only found in the British Isles associated with the ancient Celtic race ;
- (2) That the similarity of characters sometimes found in the Egyptian writings is merely coincidence ;
- (3) That had Ogham been introduced into Ireland by invaders, inscriptions would have been found in the lands whence they came.

Oglethorpe, JAMES EDWARD, founder of Georgia, was born in London on December 22nd, 1696, and educated at Corpus Christi College, Oxford. He entered the army, and after the peace of 1712 served under Prince Eugène in the campaign against Turkey. After he returned to England he became M.P. for Haslemere. Aghast at the scandalous nature and abuses of debtors' prisons, he grew interested in philanthropic work,

and, believing that emigration was a remedy for some of the social evils in old communities, acquired a charter for settling the colony of Georgia in North America. During part of his stay in the New World he had the services—which did not prove an unmixed blessing—of Charles Wesley as secretary and John Wesley as missionary. When war broke out between Great Britain and Spain, Oglethorpe's colony was in serious jeopardy, but his resolute bravery and enterprise saved it. Financial troubles then arose, and he returned to England in 1743 to aid a settlement which, however, he failed to compass. He was implicated in the Jacobite rebellion of 1745, but acquitted after court-martial. He never went back to Georgia.



JAMES EDWARD OGLETHORPE.
(From the portrait by T. Burford.)

and, losing his seat for Haslemere in 1754, retired into private life. He died at Cranham Hall, Essex, on July 1st, 1785, after a long life of versatile utility, immortalised by Pope's couplet—

One, driven by strong benevolence of soul,
Shall fly like Oglethorpe from pole to pole.

Ogoway, or OGOWÉ, a river of French Congo, West Africa. It rises in 2° 40' S. in a sandy plateau north of the basin of the Congo, about 300 miles from the west coast of Africa. On approaching the sea, it receives several large affluents, and opens out into a broad stream 8,000 feet wide, connected with the lakes Ajingo and Jonanga. It is then split by a delta, some 80 miles long, into

several branches, of which the most northerly, the Nazareth, enters the ocean a little above Cape Lopez, whilst the southern streams are lost in the lagoons of Cama and Fernan Vas. It is 750 miles long, and is navigable from its mouth to N'Jolé, a distance of 235 miles.

Ohio, a river of North America, formed by the junction of the Alleghany and Monongahela at Pittsburg, Pennsylvania. From this point it flows in a west-south-westerly direction for 950 miles, till it joins the Mississippi (of which it is one of the principal affluents) at Cairo, 193 miles below the confluence of the Missouri. It has a total length of 1,000 miles, and drains an area of 210,000 square miles, receiving, on its right, the Muskingum, Scioto, Miami, and Wabash, and, on its left, the Great Kanawha, Big Sandy, Licking, Green, Cumberland, and Tennessee, the last two being its chief tributaries. Excepting in low water, large steamers navigate it from Pittsburg to its mouth. The larger towns on its banks are Pittsburg, Wheeling, Marietta, Portsmouth, Newport, Cincinnati, Covington, Madison, Louisville, New Albany, Evansville, and Paducah.

Ohio, a north central state of the American Union, bounded on the N. by Michigan and Lake Erie, on the E. by Pennsylvania and West Virginia, on the S. by West Virginia and Kentucky, and on the W. by Indiana. It covers an area of 41,060 square miles, most of which consists of an undulating plain, divided by a watershed running N.E. to S.W. into two unequal districts, the larger drained by the Ohio and the smaller discharging its waters (principally the Maumee, Portage, Sandusky, Huron, Vermilion, Black, Rocky, Cuyahoga, Grand, and Ashtabula) into Lake Erie. The soil produces abundance of wheat, maize, oats, potatoes, fruit, hay, tobacco, barley, and rye, besides supporting great numbers of oxen and sheep. The wool-clip is one of the largest in the United States, and dairy produce is of growing importance. There still exist many tracts of virgin forest, yielding valuable timber. The mineral wealth mainly comprises vast deposits of coal, iron ore, and petroleum. In the iron and steel industry the state is pre-eminent, every branch of output being strongly represented. The other industries include brewing and distilling, meat-packing, lumbering and timber products, tobacco, textiles, boots and shoes, agricultural implements, chemicals, pottery, soap, candles, and paper. The Lake Erie and some of the river fisheries are of value. The chief towns are Cleveland (pop. 381,768), Cincinnati (325,902), Toledo (131,822), and Columbus, the capital (125,560). The area west and north of the Ohio, till then disputed for by French and British, was in 1763 ceded to Great Britain, and by her transferred to the United States in 1783. Towards the close of the 18th century the Indians displayed much hostility, but Wayne's victory over them, in 1794, at Fallen Timbers, on the Maumee, reduced them to peace and order. Ohio entered the Union in 1803. In the war with Great Britain of 1812-13 several naval

conflicts took place on Lake Erie. By means of the Erie Canal, completed in 1825, the State was afforded communication with the Atlantic. Three Presidents—Rutherford Hayes, Garfield, and McKinley—were natives of Ohio. Pop. (1900), 4,157,515.

Ohm, GEORG SIMON, was born at Erlangen, Germany, in 1781. He was appointed professor of mathematics in the Jesuits' College at Cologne in 1817, and at Nuremberg in 1833, and, in 1852, professor of experimental physics at Munich, where he died on July 6th, 1854. A voluminous writer, only one of his works, *Die galvanische Kette mathematisch bearbeitet*, published in Berlin in 1827, is of the first rank. This has had a most important influence on the development and application of electricity, and Ohm's Law, which summarises his conclusions, is well known. It has stood the severest tests, and is the basis of the system of electrical measurements. Ohm's great service to electrical science consisted in his having successfully dealt with phenomena which had eluded previous research. This is demonstrated by the rapid advance made since his principles were adopted. An electrical measurement known as the *ohm* was so named in his honour.

Ohm's Law. When an electric current is flowing along a wire or other conductor its strength depends partly on the electromotive force which is driving it, and partly on the resistance of the wire. It is found that the strength of the current (*c*) is equal to the quotient obtained by dividing the electromotive force (*E*) by the resistance (*R*) of the wire : $c = \frac{E}{R}$. This is known as Ohm's Law.

Ohnet, GEORGES, novelist and dramatist, was born in Paris on April 3rd, 1848. He was called to the Bar, but soon turned from law to literature. As early as 1870 he was writing for the *Pays* and *Constitutionnel*, and in 1875 produced a 5-act drama called *Irigina Serpi*, followed in 1877 by a 4-act comedy entitled *Marthe*. In 1881 he published *Serge Panine*, the first of a series of novels comprehended under the title of *Les Batailles de la Vie*. The next year appeared *Le Maître de Forges*, succeeded by *La Comtesse Sarah* (1882), *Lise Fleuron* (1884), *La Grande Marnière* (1885), *Les Dames de la Croix-Morte* (1886), *Volonté* (1888), *Le Docteur Ramcau* (1889), *Dernier Amour* (1889), *L'Âme de Pierre* (1890), *Dette de Haine* (1891), *Le Droit de l'Enfant* (1894), *L'Inutile Richesse* (1896), *Au fond du Gouffre* (1899), *Gens de la Noce* (1900), and many others, several of which he dramatised with signal success.

Oil-Beetles, a group of small wingless black beetles belonging to the genus *Meloe*, the members of which live on grass, etc. The larvæ attach themselves to bees, which unconsciously carry them into the hive, where they feed on the pollen stored up as food for the larvæ of the bees.

Oil-Cakes consist of the residue of oil seeds from which a large amount of the oil has been

extracted. The following is the usual proportion of the ingredients :—

	Linseed Cake (English).	Rape Cake.	Decorated Cottonseed Cake.	Poppy Cake.
Water	12	11	9	12
Flesh-forming principles	28	30	38	32
Oil	10	11	13	6
Gum, mucilage, etc.	34	30	20	30
Woody fibre	10	10	9	9
Mineral matter (ash)	6	8	11	11
	100	100	100	100

Linseed-cake is especially used in completing the fattening of oxen. The colour should be reddish-brown, the appearance uniform, and the taste and smell pleasant; a disagreeable smell and a greyish tint betrays adulteration. Rape-cake is not so well flavoured as linseed-cake. Some feeders consider it as nutritive, while others believe it to be very inferior. When free from mustard and of good quality, it is more economical than linseed-cake. It is said that the fat of cake-fattened cattle is readily flavoured by the predominant oil. Oil-cakes are also used as manures.

Oil-Engines, the term usually applied to those engines in which the oil fulfils certain functions; it may be used as fuel, or be the working agent itself, being converted into gas in the cylinder, as water is into steam in the steam-engine. An oil both easily obtained and cheap is necessary for success, hence the Priestman Oil-Engine by using petroleum marked a distinct epoch in the history of heat-engines. Oil-engines are usually small and compact; they require very little hand-labour, and can be started or stopped instantaneously.

Oils. A large number of bodies varying greatly in their nature, mode of occurrence, and chemical characters, is included under this term. They are more commonly understood to be more or less viscous, liquid substances, inflammable and insoluble in water. They are composed chiefly of carbon and hydrogen, with oxygen frequently and sometimes sulphur, etc. Formerly, however, many other liquids of an oily consistency were known as oils which are not now so regarded, *e.g.* oil of vitriol. The name is usually restricted to substances which are liquid at ordinary temperatures, and so distinguished from the fats, which are, however, not chemically distinct. Oils may be divided broadly into three classes: the mineral oils, the fixed oils, and the essential or volatile oils. The first of these form a class of very inflammable liquids, which are chiefly obtained from borings or wells in the earth, largely at Pennsylvania, Canada, and Caucasasia. They consist almost entirely of hydrocarbons, and are very generally employed as illuminants, for fuel, and in a number of industrial purposes, *e.g.* naphtha, petroleum-fuel. The fixed oils are all more or less closely chemically related to

one another, being compounds of different organic acids with glycerine. They exist largely in animal and vegetable organisms, and are obtained from natural sources. From vegetation the oils are usually extracted by incisions, by pressure of containing organs with, if necessary, the aid of heat, or by dissolving out the oil by means of a suitable solvent. The chief acids present in these compounds and the fats are palmitic, stearic, and oleic, the two former being in greater quantities in the solid fats than in the liquid oils. Some oils dry and harden if exposed to the air. Such drying oils are largely used as media for paints, etc. Other oils do not dry, but remain greasy under the same conditions, and are hence useless for mixing with pigments. Linseed oil, hemp oil, nut oil, poppy oil, are examples of drying oils; while olive oil, almond oil, colza oil, rape oil, castor oil, etc., are non-drying. A number are used medicinally, as croton, castor, cod-liver, almond oils, etc. Very many are used as articles of diet, while others find employment as illuminants and fuels. They are also extensively used for the manufacture of soaps and candles, as lubricants, varnishes, in painting and perfumery, and for many other purposes. The essential oils do not exhibit the thick oily feel of the previous class. They are usually colourless or slightly yellow liquids, insoluble in water, and very inflammable. They are obtained chiefly from plants by pressure, maceration, extraction, or by distillation. They are usually of the nature of ethereal salts of organic acid, and find application in perfumery, many of them possessing most agreeable odours. Almost all are used in medicine, and many are employed as flavouring materials, as, *e.g.*, oils of cloves, nutmeg, carraway, etc.

Ointments are mixtures of various drugs with fatty material, such as lanoline, suet, wax, lard, benzoated lard, oil, or vaseline, and intended for outward application. Ointments can be made up from many substances, but the most familiar are zinc ointment, boracic ointment, and the red and white precipitate ointments.

Oise, a river of northern France. It rises by two streams, one of which has its source near Rocroi in the Ardennes, the other near Chimay, in Belgium. Flowing south-westwards, past Guise, Chauny, Compiègne, and Pontoise, it joins the Seine on the right near Conflans, after a course of about 180 miles. The river Aisne, on the left, is its principal tributary.

Oise, a northern department of France, bounded on the N. by Somme, on the E. by Aisne, on the S. by Seine-et-Marne and Seine-et-Oise, and on the W. by Eure and Seine-Inférieure. It has an area of 2,272 square miles. The principal rivers are the Oise, Aisne, Thérain, Ourcq, and Epte. The surface is hilly in parts, and there are many fine forests, especially those of Compiègne, Ermenonville, Chantilly, and Hallate. The chief crops are wheat, oats, beetroot, potatoes, rye, and mangold. Sugar is the leading manufacture, and other industries include iron and steel (Montataire and Creil), lace (Chantilly), tapestry and carpets (Beauvais),

besides woollens, blankets, hosiery, pottery, porcelain, and glass. Beauvais (20,300) is the capital. Pop. (1901), 405,642.

Ojibways. [CHIFFEWAYS.]

Oka, a river of central Russia, rising in the government, or province, of Orel, flows northwards through the governments of Tula and Kaluga, then bends eastwards through that of Moscow, dips to the south-east in Riazan, turns to the north-east through Vladimir and Nijni-Novgorod, where it joins the Volga, after a course of nearly 1,000 miles. The chief tributaries are the Moskva and Kliasma, on the left, and the Tsna, on the right.

Oka, a river of Siberia, rising on the Chinese frontier and flowing north, through the government of Irkutsk, till it unites with the Angara at Bratskoi. It is about 600 miles in length, and receives the waters of the Ija from the west.

Okandas, a large nation about the middle course of the Ogway river, West Equatorial Africa. They are a tall fine race of negroid type, but cannibals, as indicated by the custom of filing the teeth to a point. They are everywhere known by the habit of going about with a "walking stick" 5 to 6 feet long, which is never laid aside. The dead are neither buried nor burned, but thrown into the river weighted with a large stone to prevent the body from rising, in which case the head would be taken and converted into a fetish by the neighbouring Aduma and Osyeba tribes.

Okapi (*Ocupia johnstoni*), a remarkable ruminant of the Giraffe family, described by Prof. Ray Lankester from a skin and skull obtained by Sir



OKAPI.

Harry Johnston in the emliki Forest, in Equatorial Africa, between Lakes Albert and Albert Edward. It is about the size of a cow, with a long neck, dun-coloured, and with zebra-like markings

on the flanks and limbs. A specimen was captured in 1906 by Captain Boyd Alexander whilst engaged in an expedition in the Congo Free State.

Oken, or OCKENFUSS, LORENZ, naturalist, was born at Bohlsbach, Baden, on August 1st, 1779, and educated at Würzburg and Göttingen. At the latter place he published his *Grundriss der Naturphilosophie* (1802), in which he contended that the Classes of the Animal Kingdom (of which he recognised only five) are really a representation of the different organs of sense, and that animals should therefore be grouped according as these organs first made their appearance. The Birds, for instance, he called the Otozoa, because in them the external ear is first found. In 1807 Oken became Professor of Medicine at Jena. His *Lehrbuch der Naturphilosophie* appeared in 1809-11. In 1816 he began to issue his *Isis*, a publication which came out periodically and in connection with which he suffered a good deal of persecution. When he was required to suppress the *Isis* or resign his chair, he pluckily preferred to leave Jena and continued to publish his magazine till 1848. In 1828 he went to the newly-founded University at Munich, quitting it four years later and accepting, in 1833, the chair of Natural History at Zürich, where he died on August 11th, 1851.

Oklahoma ("Beautiful Land"), a Territory of the United States, bounded on the N. by Kansas and Colorado, on the E. by Indian Territory, on the S. by Indian Territory and Texas, and on the W. by Texas and New Mexico. It occupies an area of 39,030 square miles. The surface has a considerable elevation, averaging from 900 to 2,500 feet, and reaching in the far north-west a height of 5,000 feet. In the south rise the Wichita Mountains. The chief rivers are the Arkansas, Cimarron, Canadian and Red River. The minerals include salt, gypsum, and coal, besides gold, silver, copper and petroleum. The leading crops are wheat and maize; fruit, of which the peach is prominent, is grown, and stock-raising is an industry of increasing importance. Originally Oklahoma formed the western part of Indian Territory ceded in 1866 to the United States by the Indians, who stipulated that the land was to be settled by Indians and not by whites. The red man, however, did not occupy the whole area, and by and by white "boomers" began to covet the virgin portion. At last (1889), in consideration of a money payment, the Creeks and Seminoles agreed to the white man settling their unassigned lands. An ugly rush at once was made, no fewer than 50,000 persons peopling a new district in one day. The Territory was organised in 1890. Next year the land of the Sacs, Foxes, Iowas and Pottawomies was acquired for settlement, and two years later the Cherokees came to terms with Government and their district of 6,000,000 acres was placed at the disposal of the white men, who entered into possession without delay.

Okotas, a widespread people of the Ogway basin, West Equatorial Africa, who originally occupied the right bank of that river. About 1870 they were attacked and dispersed in all

directions by the fierce Ossyebas (Fans), and are now found in small groups scattered over a vast area, though still most numerous in the islands of the Ogoway about the N'Jolé rapids. The neighbouring Yalibongos (Alimbongos) and the Bakotas, who dwell higher up near the Sébé confluence, appear to be all members of the Okota family, some of whom have also been met with in the forest districts watered by the Ivindo river.

Oku, BARON, general, was born at Kokura, Japan, in 1844. In the feudal *regime* he belonged to the Samurai and, during the Satsuma rebellion of 1877, was a major in the Imperial army, being besieged for four months in the castle of Kumamoto. He was ennobled for distinguished service in the war against China (1895), in which he commanded the Fifth Division. In the Russo-Japanese War of 1904-5 he was in command of the 2nd Army Corps, was victorious at Kin-chau and engaged in the battle of Liao-yang and the subsequent operations round Mukden.

Olaf, the name of several kings of Norway. The greatest of them all was Olaf II. (Haroldsson), known as St. Olaf, who wrested the Norwegian throne from Eric, Earl of Norway, and Earl Svend in 1015, and began to propagate Christianity. His subjects rebelled and called in Canute the Great from Denmark, and Olaf, being expelled, fled to his brother-in-law Jaroslav of Russia, who lent him men to recover his throne. His enterprise, however, failed, and he was killed in 1030 at the battle of Stikeland. He became the patron saint of Norway, and so lately as 1847 a knightly order was established in his honour.

Olbers, HEINRICH WILHELM MATTHIAS, astronomer, was born at Arbergen, near Bremen, Germany, on October 11th, 1758. He studied medicine at Göttingen, where he also attended Kæstner's mathematical course. While watching beside the bed of a sick fellow-student in 1779, he devised a method of calculating cometary orbits, which is still largely used. In 1781 he began practising as a physician in Bremen, retiring after forty years on January 1st, 1823. Four hours' sleep being sufficient for him, he was able to devote the greater part of the night to astronomical observation. He made a special study of comets, that of 1815 being named Olbers' Comet in his honour. Olbers was deputed to attend the baptism of the King of Rome in 1811, in which year he won the prize offered by Napoleon for the best memoir on the Group. He died at Bremen on March 2nd, 1840.

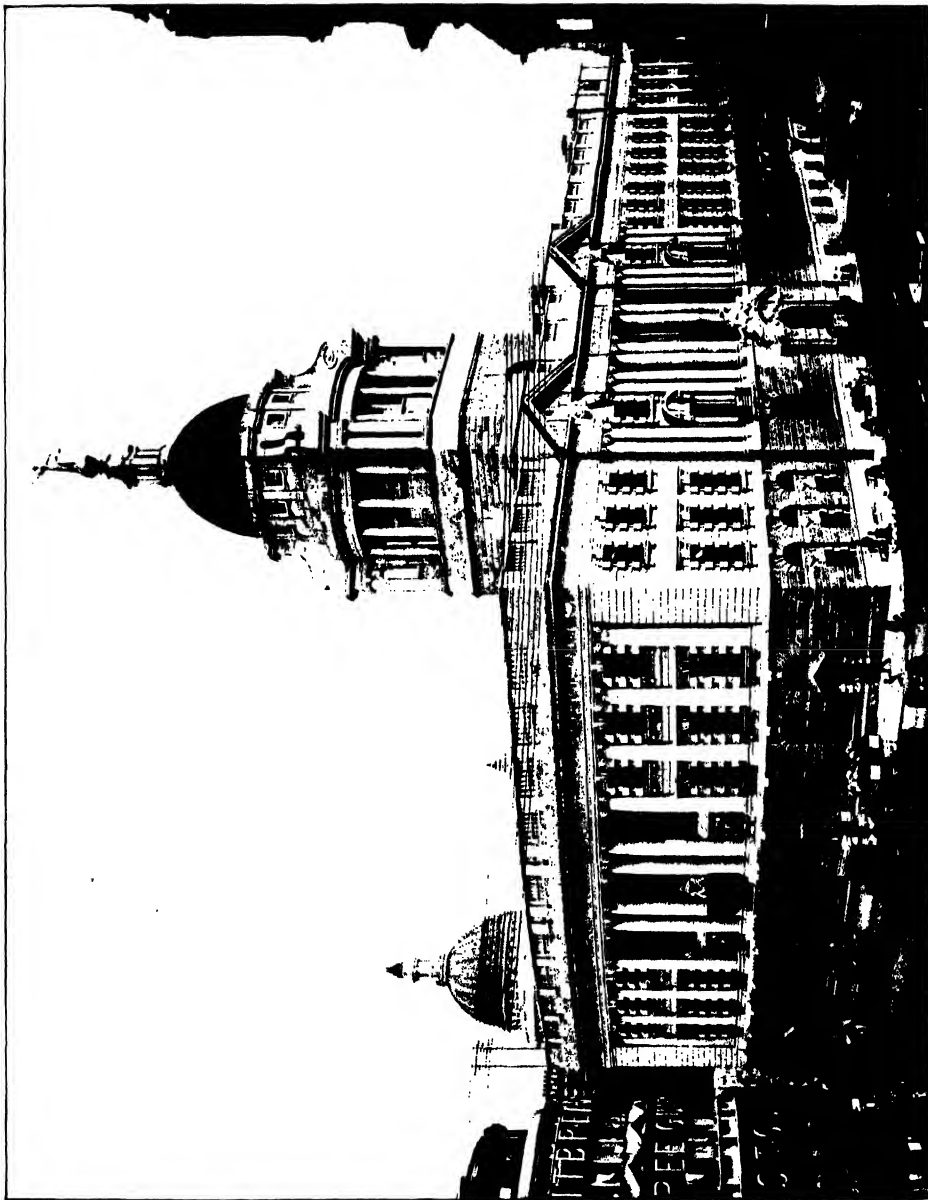
Old-age Pensions, annuities furnished by the State for the benefit of indigent non-criminal persons of the age of 65. The provision of such relief has been advocated periodically since the publication (1772) of Francis Miseres' *Proposal for Establishing Life Annuities in Parishes*, and his *Considerations* (1773) of the Bill to give effect to his scheme, a measure which passed the Commons but was thrown out by the House of Lords. The subject, however, has never reached the stage of

practical politics, since the wit of no reformer has succeeded in devising a comprehensive scheme that did no violence to public opinion. Canon Blackley's plan of compulsory insurance was rejected by a Select Committee (1885-7), and the unofficial parliamentary body, of which Mr. Joseph Chamberlain was chairman, put forward (1892) several suggestions, *inter alia*, to double every half-crown of pension derived by members from friendly societies. State intervention of some kind was looked upon as inevitable. Charles Booth, on the other hand, proposed a general endowment of 5s. a week for every person aged 65. This was estimated to cost £24,000,000 a year for the United Kingdom. Among those who objected to it was Mr. Chamberlain himself, who (1899) described it as "a gigantic system of outdoor relief," under which the thriftless, the drunkard and the ne'er-do-weel would profit as much as the thrifty and industrious. The enormous cost of any well-considered scheme has proved the *crux* of the problem, which is as far as ever from a practical solution.

Old Bailey, the court or sessions-house in which are held the monthly sittings of the Central Criminal Court, established in 1834, for the trial of offences committed in the City of London, the county of Middlesex, and parts of other counties within a certain distance of the Metropolis. The name is properly that of the street itself, which runs from Ludgate Hill to Smithfield. The judges of the Central Criminal Court are the Lord Mayor, the Sheriffs, the Lord Chancellor, the Judges, the Aldermen, Recorder, Common Serjeant of London, Judge of the Sheriffs' Court, or City Commissioner, and any others whom the Crown may name as assessors. Those who actually preside, however, are the Recorder and Common Serjeant, a judge of the law attending only when unusual legal questions are raised or the prisoner's life is involved. Complaints having arisen of the inadequate accommodation the building afforded, Newgate Prison (which adjoined it) was demolished in 1903-5, and on its site an imposing court-house was erected and opened in 1907.

Oldbury, a town of Worcestershire, England, 5½ miles W.N.W. of Birmingham. Situated in a district rich in iron, coal, and limestone, the leading industries are concerned with iron and steel, there being several foundries. The manufactures include tools, chemicals, aluminium, and railway carriages, and there are, besides, printing, milling, malting, and brick-and-tile making. The public buildings, in the Renaissance style, contain a free library and reading-room, in addition to the District Council offices and a large hall. There is an endowed school dating from 1851. Pop. (1901), 25,191.

Oldcastle, SIR JOHN, LORD COBHAM, Lollard leader, was born about 1378. Of his earlier career little is known, but in the beginning of the 15th century he served under the Crown on the Welsh marches and in various parts of Wales. He was entrusted with the command of the army that compelled the Duke of Orleans to raise the siege of



(Photo : Pictorial Agency.)

THE NEW SESSIONS HOUSE. OLD BAILEY.

Paris in 1411. He had before this adopted the tenets of the Lollards, and soon became their recognised leader. Henry IV. protected him, but Henry V. took action against him. He was imprisoned in the Tower (1413), every effort being used to make him recant. Having escaped, he concealed himself in Wales, and his supporters rose in arms. In 1417 he was captured, brought to London, and burned alive in St. Giles's Fields. He wrote *Twelve Conclusions addressed to the Parliament of England*, and edited Wyclif's works. As a heretic his memory was held in bitter hatred, and even Shakespeare made a butt of him under the guise of Falstaff. In the first draft of *Henry IV.* the gross fat knight bore the name of "Sir John Oldcastle," which was altered later to "Sir John Falstaff" in deference to the growing Protestantism of the age.

Old Catholics, a religious body which arose in consequence of the dogma of Papal Infallibility promulgated by the Vatican Council of 1870. In Germany, the chief seat of disaffection, the movement was led by Dr. Döllinger, Professor of Theology at Munich, and Professor Friedrich, who were excommunicated by the Archbishop of Munich in April, 1871, owing to their refusal to submit. Those who shared the views of Döllinger and Friedrich called themselves Old Catholics, to signify that they held the primitive Catholic faith free from the later doctrines imposed by Papal authority. The first Congress was held at Munich in September, 1871, when arrangements were made for organising congregations. An episcopate was obtained from the Jansenist Church of Holland, Dr. Joseph Hubert Reinkens, the first Old Catholic bishop, receiving letters from the Bishop of Deventer in August, 1873. The alterations in the service-books, which included the translation of the Mass into the vernacular and the omission of the Invocation of Saints, caused many relapses to the Church of Rome. The Reunion Conferences held at Bonn in 1874 and 1875 were attended by divines from Germany, Switzerland, France, America, England, and other countries, but the formulæ of agreement drawn up were rejected by the Eastern Church and the Church of England. In Switzerland Bishop Hög was consecrated by Reinkens in 1876. In 1880 a branch of the communion was established in Rome under Count Campello, a former Canon of St. Peter's, who retired in 1902 in consequence of age and bodily weakness. The chief source of disunion among the Old Catholics has been the question of the celibacy of the clergy. Old Catholicism has taken root in every Roman Catholic country except Belgium. The movement appears to have lost some of its initial impetus, and the numbers of adherents do not grow. In Germany and Switzerland, where it is strongest, it musters about 60,000 followers in each country. In Austria they do not exceed 20,000, and in Holland, where Old Catholicism was founded two centuries before Vaticanism, it counts some 8,000 adherents.

Oldenburg, a grand-duchy of Northern Germany, the main portion of which borders on the

North Sea. It comprises the duchy of Oldenburg (Pop. 317,842); the principality of Lübeck (37,337), enclosed by Holstein; and the principality of Birkenfeld (43,320), enclosed by Rhenish Prussia, and has a total population of 398,499 and an area of 2,479 square miles. The alluvial coast district, protected from the sea by dykes, is fertile but swampy, producing good crops of cereals and rape, whilst inland are vast tracts of heather. The chief rivers are the Weser, the left bank of which belongs to Oldenburg, from Bremen to the sea, the Hunte, a lefthand affluent of the Weser, and the Hase, a righthand tributary of the Ems. Sheep, horses, swine, poultry, and cattle are reared in abundance, but manufactures are insignificant. **OLDENBURG**, the capital, stands on the River Hunte, about 25 miles N.W. of Bremen. The town hall and ducal palace are in the Renaissance style. There are few industries, but a large trade is carried on in grain and horses. Pop. (1900), 26,635.

Oldham, a town of Lancashire, England, on the Mersey, 6½ miles N.E. of Manchester. The principal public buildings are the Town Hall, with a Classic façade; the Free Library, Art Gallery, and Museum, in the Gothic style; the Public Baths, in the Italian; the Temperance Hall, built by the followers of Robert Owen as a Hall of Science; the Lyceum, with Observatory and School of Science



OLDHAM TOWN HALL.

and Art; St. Mary's Church, in the Perpendicular, which, in 1827, replaced an older edifice; and the Wesleyan Chapel in Manchester Street, the foundation stone of which was laid by John Wesley in 1790. The Bluecoat School, founded by Thomas Henshaw with an endowment of over £100,000, was opened in 1834. Interesting natural objects are the fossil forest discovered in 1880 in a brickfield and the enormous boulder, of 21 tons' weight, in Alexandra Park. Oldham is a leading centre of cotton-spinning, an industry employing many thousands of hands. Other great industries are iron-founding and the making of all kinds of machinery and gas meters. Coal-mining is also conducted on a large scale. "Owdham Wakes," the annual holiday of the operatives, are subscribed for by the workers every week. The members

draw out each his or her share before the vacation and then set off on their travels, some no farther than Blackpool and the Isle of Man, others as far south as Paris, and as far north as Inverness. Hugh Oldham, Bishop of Exeter, and founder of Manchester Grammar School (1515), was a native. William Cobbett and Winston Churchill have been among the Parliamentary representatives of the borough. (Pop. 1901), 137,238.

Oldhaven Beds, the name given by William Whitaker in 1866 to a series of pebble-beds and sands, from 20 to 30 feet thick, between the Woolwich beds and the London Clay. The name is taken from Oldhaven Gap, on the north coast of Kent. The pebble-beds are of rolled flints; the sands exhibit current-bedding; and the fossils include some sub-tropical plants and numerous gastropods, partly estuarine and partly marine, some belonging to species of the Woolwich beds and others to those of the London Clay. On the whole, there seems little reason for distinguishing the Oldhaven beds from the other local shingle-beds at various levels in the Woolwich series.

Old Lady (*Mormo maura*, Linn.), a moth, one of the commonest of the larger British Noctua. The colour is dark brown and the margins of the wings are scalloped.

"Old Mortality," the prototype of the character in Sir Walter Scott's novel of this name, whose career suggested part of the theme of the story, was Robert Paterson, a stone-mason, who was born at Hawick, in Roxburghshire, on April 25th, 1715. Becoming a Cameronian he left his wife and family in 1758 and devoted himself for upwards of forty years to repairing the inscriptions on the tombstones of "martyred saints" and Covenanters in the graveyards throughout the Scottish Lowlands. He was thus occupied at Dunnottar, in Kincardineshire, about 1800, when Scott met him. He died at Bankend, Dumfriesshire, on February 14th, 1801, and was buried at Cnerlaverock, where, in 1869, A. and C. Black, the publishers, erected a monument to his memory.

Old Red Sandstone, a great series of red and grey sandstones, conglomerates and shales, with a maximum thickness of 10,000 feet, the base of which often passes conformably downwards into the Silurian series, whilst its upper part passes similarly into the Carboniferous. It is termed "Old" because, lying below the Coal Measures, it is thus distinguished from the New Red Sandstone above them. The conglomerates sometimes contain large angular, possibly ice-borne blocks, and hard micaceous, calcareous, and bituminous flagstones are found in the series. There seems to be generally an unconformity dividing the Lower from the Upper Old Red Sandstone. Like most sandstones, this system contains few fossils, save in a few localities. Land plants, chiefly ferns and club-mosses, myriapods and palaeodictyopterous insects occur; but the most characteristic forms are the crustaceans and fishes. The former are Eurypterida, including the gigantic king-crab *Pterygotus*, sometimes 6 feet long; the latter, ganoids, some-

times reach a large size and are so numerous and varied that the period has been termed the "Age of Fishes." These fishes have their nearest living representatives among fresh-water forms, and this, with other facts, suggests that the Old Red Sandstone marks the beginning of a great continental period, and was deposited in a series of large fresh-water lakes. In the British Isles, Sir Archibald Geikie has traced five of these lakes in the British Isles—(1) the Welsh Lake, mainly in Herefordshire; (2) Lake Cheviot; (3) Lake Caledonia, extending from the north of Ireland through the central valley of Scotland; (4) Lake Lorn, in Argyllshire, and (5) Lake Orcadie, extending from Elgin, through Caithness and the Orkneys, to the Shetlands. This phase of sedimentation is hardly represented on the Continent; but in the New World the Gaspé Sandstones of New Brunswick and Nova Scotia are similar. Contemporaneous volcanic rocks, felsites, tufts and diabases, having a total thickness of 6,000 feet, form in Scotland the Pentland, Ochil, and Sidlaw Hills. The Lower Red Sandstone, including the Arbroath flags and valuable Caithness flags, and probably represented by the Glengarriff grits in south-west Ireland, yield *Lepidodendron*, *Calamites*, *Sigillaria*, *Pterygotus*, and such fishes as *Pteraspis*, *Cephalaspis* and *Asterolepis*. The Upper Old Red Sandstone includes the Dura Den beds in Fifeshire, crowded with *Holoptychius* and other fishes, and the Kiltoran beds in Kilkenny, in which the fern *Palaeopteris* and the fresh-water mussel *Anodon* were found. The Old Red Sandstone forms the fertile lands of the Carse of Gowrie and of the orchards and hop-fields of Herefordshire. Hugh Miller's *Old Red Sandstone*, making due allowance for additions to our knowledge of the series that have been made since it first appeared (1841), is still the classic on the subject. [DEVONIAN.]

Oleander (*Nerium Oleander*), "a small shrub of a gallant shew," as Gerard terms it, is a member of the periwinkle family (*Apocynaceae*), native to the Mediterranean region, but long cultivated in English greenhouses for its pretty rose-coloured or white flowers. It has a very poisonous milky juice, and even the flowers, leaves, and dead wood are poisonous. Its exhalations also are injurious, and it is unsafe to sleep under it. There is a ring of fringed scales in the throat of the corolla-tube; the five anthers are hairy, and each of the numerous seeds is also crowned with a tuft of hairs. The leaves are leathery, opposite, lanceolate, and olive-tinted, whence it derives its name.



OLEANDER.

Olefines are a series of hydrocarbons represented by the general formula C_nH_{2n} . They possess the power of directly uniting with chlorine, bromine, etc., with hydrochloric and allied acids to form compounds, such as C_2H_5Cl , C_3H_7Cl , etc. They are hence called unsaturated compounds. By the action of nascent hydrogen they may be converted into saturated compounds which cannot unite directly in this manner with chlorine—the paraffins. Many of them are produced by the destructive distillation of carbonaceous substances, and hence occur largely in ordinary coal gas, tars, etc. The first member of the series possesses the formula C_2H_4 , and is known as ethylene, which is a gas at very low temperatures. The higher members are solid, while the intermediate compounds remain in the liquid state under ordinary conditions.

Oleic Acid is an acid of the composition $C_{18}H_{34}O_2$ which occurs very largely in most fats and oils, *e.g.*, butter, lard, olive oil, etc., especially in the non-drying oils. In these sources it exists in combination with glycerine, from which it may be separated by treatment with superheated steam, or with (1) an alkali followed by (2) an acid. It is an oily liquid, colourless if pure, which decomposes on distillation, but may be distilled by high-pressure steam. It has a specific gravity of about .9, and may be obtained crystalline at low temperatures. An impure acid is largely used as a lubricant under the name of olein or wood oil. Many of its salts, *e.g.*, those of lead, mercury, zinc, and morphine, are used in pharmacy, principally for the preparation of ointments. Sodium and potassium oleates are the chief constituents of hard and soft soap respectively. Other allied acids of the same general characters are also known under the general name of oleic acids.

Olein. Oleins are the compounds of oleic acid with glycerine, being termed tri-, di-, or mon-olein, according to the number of HO-groups of the glycerine replaced by the acid group. The name is also given to a crude oleic acid used as a lubricant.

Oléron, an island off the west coast of France, crossed by the parallel of 46° N. It lies opposite the mouth of the Charente, belongs to the département of Charente-Inférieure, and is separated from the mainland by the Strait of Maumusson. It is 20 miles long by 5 miles wide, and has an area of 59 square miles. The soil is very fertile, and supports a population of 17,033, mostly Protestant. Ship-building is carried on, and there are large salt works, besides the salting of fish. The principal places on the island are the port of Château on the east coast, and the towns of St. Georges and St. Pierre towards the centre. A famous code of maritime law had its name and origin here, being drawn up at the direction of Eleanor of Aquitaine before she married Henry II. of England (1152). Intended for the guidance of those navigating Atlantic waters, the Judgments of Oléron were based on the customs and decisions governing the oil and wine trade in Western Europe.

Olga, SAINT, wife of Duke Ivor of Kieff, who died in 946. During her son's minority, until 955, she governed in his stead, and then journeyed to Constantinople, where she became a Christian. She was baptised in the name of Helena, and on her return to Russia laboured zealously for the spread of her new faith. St. Olga died in 968 and, being highly venerated, was canonised by the Russian Orthodox Church, her festival being observed on July 21st.

Olibanum. [FRANKINCENSE.]

Oligarchy (Greek, "rule of a few"), as employed by Plato and Aristotle, denotes the rule of a small exclusive class, who make use of their power only to promote their own interests. Oligarchy is thus opposed neither to aristocracy, "rule of the best," nor to democracy, "rule of the people," but is a corruption of either form of government, arising when both the best and the many cease to take an intelligent and vigilant interest in politics and public affairs. Most of the mediæval Italian towns afforded at some period of their history typical examples of oligarchies.

Oligocene System, a series of Tertiary rocks classed by Sir Charles Lyell as Upper Eocene, but separated by Professor Beyrich, and named from their containing a few species of Mollusca which are still living. In Great Britain it is perhaps solely represented by beds, formerly known as the Upper Fluvio-marine series, in the north of the Isle of Wight and in the New Forest. They are thin-bedded marine, brackish, and fresh-water sands; clays, marls, and limestones, and subdivided as follows:—

HEMISTEAD BEDS.—Marls, about 160 feet thick, with a marine clay above, but mostly fresh-water and estuarine, containing *Nucularius lentus*, *Melania*, *Cyrena*, *Unio*, *cyprids*, and *gyrogonites*.

BEMBRIDGE BEDS.—Estuarine marl (62 feet) above, with *Ostrea vetensis*, and fresh-water limestone (20 feet), with *Limnaea longicauda*, below.

OSBORNE, ST. HELENS, AND BROCKENHURST BEDS.—About 70 feet thick, fresh-water, with the Nettlesome Grit, a building-stone.

HEADON BEDS.—Clays and limestones, 180 feet thick, fresh water above and below, marine in the middle.

In Switzerland, 6,000 feet of lacustrine sandstones, marls, and conglomerates, known as *nagelfluh*, or *molasse*, and now elevated into the Jura and Rossberg, were deposited during this period, as were also the lignites of the Lower Rhine and the amber-containing glauconitic sands of Königsberg. The eruptions of Antrim, Mull, Skye, the Faroes and Greenland were probably continued from the previous Eocene period, those in Auvergne and the Eifel being somewhat later, and this and the succeeding Miocene epoch were probably the period when the Alps and Pyrenees were uplifted, and the great east and west folds of Cretaceous and Eocene rocks were produced that formed the Vienna, Paris, Artois, Hampshire, and London basins, the monoclinical fold of Dorset and Wight, and the anticlinal of the Weald. Palæotherium and other tapirid forms occur in rocks of this period, especially in the

gypsum beds of Montmartre in the northern area of Paris, giving place higher in the series to Rhinoceros. Carnivora also occur, but still exhibit marsupial characters.

Oligochæta, an order of worms, including all those which have either few or none of the hair-like lateral appendages known as setæ. The common earthworm (*Lumbricus terrestris*) is the most familiar member. This order is the second in size of the class Chatopoda or setæ-bearing worms; the other orders are the Polychæta, and two less important but interesting orders—the Chatopoda ectoparasitica, and the Archi-Chatopoda. The points which separate the Oligochæta from the Polychæta are as follows:—As regards their structure, the members of the former order have neither feelers (antennæ), nor lateral processes forming legs (parapodia), nor certain tactile appendages above and below the parapodia, known as cirri, nor gills (branchiæ); setæ are never numerous, and are sometimes absent, as in the genus *Anachæta*; the animals are hermaphrodite, i.e., both male and female organs of generation occur in the same individual. As regards their development, the ova or eggs are laid in small masses in cocoons, and they do not undergo the striking changes in shape of a metamorphosis. They differ, moreover, in their mode of life, as, though often aquatic, they are never marine and are generally terrestrial. The order includes many different families; besides the common earthworms (Lumbricidae), the best known members are the Red-River worms or Tubificidae, the Naididae, including the small lacustrine Nais, the Discodrilidae, including Branchiobdella, which is a parasite on the lobster, and may be a leech (Hirudinea), and the Eelosomeidae.

Oligoclase, a plagioclase feldspar, having a specific gravity between 2.6 and 2.66, a silica percentage of about 63, and more soda than lime. According to Tschermak's theory, it consists of from two to six molecules of albite mixed with one of anorthite. It is light-coloured, slightly translucent and slightly fusible. It accompanies orthoclase in many granites and trachytes, and occurs also in porphyrites and andesites. From its composition it is sometimes termed soda-lime feldspar.

Oliphant, LAURENCE, author and mystic, was born at Capetown, South Africa, in 1829, and educated for the Bar. He published *A Journey to Khalmandu* in 1852, *The Russian Shores of the Black Sea* in 1853, and other works of travel. In 1855 he took part in the Trans-Caucasian campaign in connection with the Crimean War, acting as correspondent for *The Times*, whose editor (Delane) he accompanied next year in a tour through the United States, where he joined the filibuster Walker. An account of his Circassian and other adventures afterwards appeared in his *Patriots and Filibusters* (1860). He became private secretary to Lord Elgin in China in 1857, and held for a time the post of *chargé d'affaires* at Peking. He was appointed first secretary of the Legation in Japan in 1861, and nearly lost his life in the

murderous assault on the embassy on July 5th. On his return to Europe he sat in Parliament for the Stirling burghs from 1865 to 1868. In 1870 he published a novel, *Piccadilly*, in which he satirised the hypocrisy and corruption of Society. Meanwhile mysticism attracted him, and he went off with his wife to join a religious community established in the United States under the auspices of a teacher named Harris. He lost most of his fortune in this enterprise and, quitting the United States, visited Palestine, interested in a scheme (that proved abortive) for colonising the Holy Land with Jews. Of these experiences he gave an account in *The Land of Gilead* (1880). After a short stay in England and the United States he returned to Palestine, and at Haifa, on the Bay of Acre, wrote his *Altiora Peto* (1883). His strange beliefs and hallucinations continued, and were recorded in *Symptomata* (1885) in conjunction with his wife, who died during a trip to Lake Tiberias on January 2nd, 1887. Returning to England, he published his last book, *Scientific Religion* (1888), and afterwards married a granddaughter of Robert Owen, whom he had met in the United States. A few months later he expired at Twickenham on December 23rd, 1888.

Oliphant, MARGARET OLIPHANT WILSON, novelist and writer of books, was born near Musselburgh, Scotland, on April 4th, 1828, and soon manifested a strong bent towards literary work. From 1849, when she published *Passages in the Life of Mrs. Margaret Mailand*, almost to the close of her life she exhibited extraordinary fertility and resource. Of the many novels that came from her prolific pen may be named *Merland* (1851), *Salem Chapel* (1863), *The Rector and the Doctor's Family* (1863), *The Perpetual Curate* (1864), *Miss Marjoriebanks* (1866)—the last four together forming the *Chronicles of Carlingford*—*Agnes* (1866), *Madonna Mary* (1867), *Ombra* (1872), *Innocent* (1873), *Phoebe Junior* (1876), *Carita* (1877), *Hester* (1883), *The Wizard's Son* (1883), and *The Ladies Lindores* (1883). Fiction by no means monopolised her pen, for she was also the author of a *Life of Edward Irving* (1862), *The Life of St. Francis of Assisi* (1871), *The Makers of Florence* (1874), *The Makers of Venice* (1887), *The Makers of Modern Rome* (1895), besides biographies of Count Montalembert (1872), Principal Tulloch (1888), Dr. Chalmers (1893), Laurence Oliphant and his wife (1892), monographs on Dante, Cervantes and Sheridan, a history of the great publishing house of Blackwood, for which the bulk of her work was done, and an account of the more domestic side of the life of Queen Victoria, with whom she was on terms of special intimacy, which she wrote for Cassell & Company. Mrs. Oliphant had married her cousin, Francis Wilson Oliphant, in 1852, but his death in Rome in 1859, leaving her with a small family, necessitated unflagging industry on her part and, whether she felt the spur or no, she rose courageously to the necessities of her position and conquered them all. She died at Windsor on June 29th, 1897.

Olivares, GASPARO DE GUZMAN, COUNT, DUKE OF, Spanish statesman, was born in Rome on January

6th, 1587. He was educated at Salamanca, and early taken into the service of the future king, Philip IV., who made him Prime Minister. For five-and-twenty years Olivares held almost absolute power, and used it in a vain attempt to restore the military and political prestige of Spain. In 1640 Catalonia revolted, Portugal asserted her independence, and in 1643 Olivares was banished to Toro, in the province of Zamora, where he died on July 22nd, 1645.

Olive (*Olea europæa*), the best known and most valuable of a genus of about thirty species of small trees with very hard wood, which forms the type of the order Oleaceæ to which the ash, privet, and lilac belong. It is probably a native of Syria, and the cultivation of it, though not familiar to the writer of the *Iliad*, is mentioned in the *Odyssey*. First grown on the limestone hills of Attica, Italy probably received the olive from Greece; Gaul, Spain, and possibly Great Britain, from the Romans; Chile from Spain; Mexico and California, from Jesuit missionaries; and China, Australia and Cape Colony, from still more modern enterprise. It is almost hardy in the south of England, flowering and occasionally fruiting, but not ripening. It is a small tree, seldom more than 30 feet high, of slow growth, but sometimes exceeding 20 feet in girth and seven centuries in age. The wild olive or oleaster (var. *syliæstris*) has squarish, spinous branches; opposite, evergreen, leathery,

larger fruit, and thicker and more fleshy pericarp. For pickling, the fruits are gathered unripe, soaked in an alkaline lye, and then bottled in brine. For oil, the ripe fruit, the pericarp of which usually yields 60 to 70 per cent., is squeezed, yielding virgin oil, and the marc or cake is wetted and repressed, and the kernels are crushed and boiled to yield a second and third quality. The tree grows best on light or calcareous soils near the sea, and the value attached to its oil as an article of food in countries where butter can with difficulty be preserved made the tree from early times the symbol of peace and good-will. Enormous quantities are exported from Marseilles, Nice, Genoa, Leghorn and Naples.

Olives, THE MOUNT OF, or MOUNT OLIVET (modern Jebel-el-Tûr), a range of hills on the east of Jerusalem, from which they are separated by the brook Kidron. The ridge has an average level of 2,600 feet, culminating in four summits known as Galilee (Scopus), north-east of and a mile distant from the Temple site; the Ascension, due east of and about $\frac{1}{2}$ mile from the site of the Temple; the Prophets, practically a spur of the Ascension; and the Mount of Offence, the summit of which is on the same level as the site of the Temple. David fled from Jerusalem over Kidron by the Mount of Olives into the wilderness. It was on the southernmost height that Solomon established his idolatrous worship of Chemosh and Moloch. The Garden of



MOUNT OF OLIVES.

[Photo: Bonjils.]

shortly-stalked leaves, hoary on their under surface; axillary, erect racemes of small white flowers; and small valueless fruit. The calyx and corolla are both four-cleft; there are two exerted stamens, and the ovary is two-chambered and two-styled, each chamber containing one pendulous ovule, though the stony endocarp of the double drupe generally contains but one seed. The cultivated olive (var. *sativa*) differs in its rounder branches which have no spines, but longer leaves,

Gethsemane lay beyond the brook Kidron at the base of Olivet. Jesus made His triumphal entry into Jerusalem over the summit of the Mount of Olives, and at the spot where now stands the church commemorating the event, He ascended into Heaven.

Olivine, a mineral consisting of a variable mixture of magnesium and iron silicates, Mg_2SiO_4 and Fe_2SiO_4 , crystallising in the prismatic system,

but often occurring in irregular grains, transparent when unaltered, varying in colour from olive-green to yellow, with glassy lustre, conchoidal fracture, specific gravity between 3.2 and 3.5, and hardness between 6.5 and 7. Olivine is an essential constituent of basalt, occurs in some gabbros, and is the main constituent of the peridotites. A pale yellowish-green transparent variety, found in the Levant, is known as chrysolite and a leek-green one as peridot. These are cut as gems. Olivine is often flawed, and is very liable to alteration by percolating waters or weathering, a change into opaque serpentine, or into limonite, spreading along the flaws, until the whole crystal may be altered.

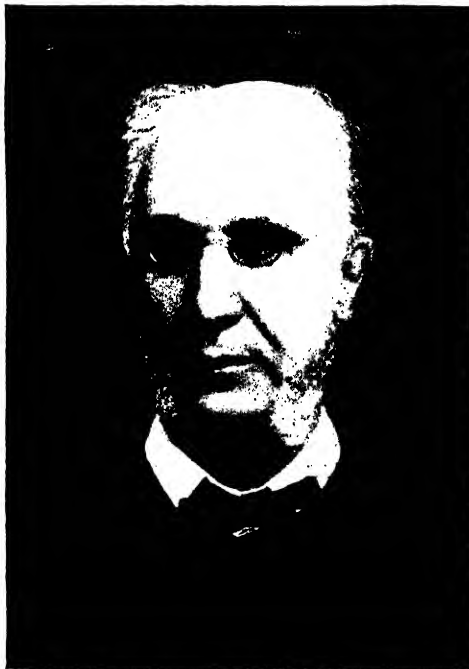
Olla podrida (Spanish, literally "rotten" or "putrid pot"). A Spanish national dish consisting of meat of all kinds, cut into small pieces, and various vegetables, seasoned with pepper and garlic, stewed in a closed pot. It is popular with the poor and is often kept so long that it becomes offensive—hence the name. The equivalent (without the putridity, however) in France is *pot pourri*, and in Scotland *hotch potch*, and all of these expressions are used figuratively in reference to any odd mixture or collection. Randolph in the *Muses' Looking Glass*, 1638, wrote: "A mere Olla podrida, a medley, of ill-placed, and worse penn'd humours"; and Lord Herbert, in his *Autobiography*, 1638, "Nine dishes . . . the first whereof was, three *Ollas podridas*."

Ollivier, OLIVIER EMILE, statesman and author, was born at Marseilles, France, on July 2nd, 1825, and was called to the Paris Bar. He joined the revolutionary party in 1848, when he obtained an official position under the Republic. In 1857 he entered the Chamber, and won high reputation as an independent and able politician. In 1866 M. Ollivier broke with the Left, and formulated a policy whereby all moderate men should be united under a progressive and conciliatory Imperial programme. To attempt the realisation of this dream he was admitted to office at the critical period of 1870, but he accepted, as he said, the responsibilities of his post "*d'un cœur léger*," an assurance which seemed to savour of flippancy in circumstances that were so soon to become disastrous, and which was never forgotten or forgiven. The fatal issue of the battle of Wörth hurled his Cabinet from power. Ollivier himself retired into Italy, but returned in 1873, to find his unpopularity undiminished. After in vain trying again to enter the Chamber, he devoted himself to literature. He had been elected member of the Academy in 1870, in succession to Lamartine, but was not permitted to enjoy the usual public reception. Among his works are *Démocratie et Liberté* (1867), *Lamartine* (1874), *Principes et Conduite* (1875), *L'Eglise et l'État au Concile du Vatican* (1879), *Nouveau Manuel de Droit Ecclésiastique Français* (1885), *Michel Ange* (1892), *L'Empire Libéral* (1894-8), and *Marie-Magdeleine* (1896).

Olmütz, a town of Moravia, Austria, on the March, 40 miles N.E. of Brünn. The principal buildings are the 14th-century cathedral; St.

Maurice's Church, with a famous organ; the barracks, once a Jesuit monastery; the Town Hall, with a spire 255 feet high, an astronomical clock, and a chapel now converted into a museum; and the archbishop's palace. The university has been reduced to a theological faculty, but the library remains. The industries include brewing, distilling, milling, and the making of sugar, starch, and chemicals. Till 1640 Olmütz was the capital of Moravia, being replaced then by Brünn. It was occupied by the Swedes in the Thirty Years' War and besieged by Frederick the Great in 1758. Lafayette was imprisoned by the Austrians in the fortress, but was released in 1797 by Napoleon. Ferdinand I. signed his abdication here in 1848. Pop. (1900), 21,933.

Olney, a town of Buckinghamshire, England, on the Ouse, 11 miles W. by N. of Bedford. Its chief interest is its association with William Cowper, the poet, who dwelt from 1767 to 1786 in a great house still standing in the capacious Market Place. The house contains several relics of the poet, and in the garden is his favourite seat. The church of St. Peter and St. Paul is that in which Cowper's friend, the Rev. John Newton, the hymn-writer, was curate for several years. His remains were removed in 1893 from the Church of St. Mary Woolnoth, London, where he was buried, and re-interred in Olney Churchyard. Newton's successor in the curacy was Thomas Scott, the Commentator.



OLIVIER EMILE OLLIVIER
(Photo: Benque & Co., Paris.)

The Cowper Memorial Chapel of the Congregationalists dates from 1879, and there is a Baptist chapel, built in 1694 and rebuilt in 1893. The



COWPER'S HOUSE, OLNEY.

(Photo: Chester Vaughan & Co., Acton.)

industries of the town include brewing and the making of boots and shoes, but it is also an important agricultural centre. Pop. (1901), 2,347.

Olonellus, a genus of Trilobites, which has come into prominence owing to its being characteristic of the lowest Cambrian strata. It is very like *Paradoxides*, a genus much better known.

Olympia, a valley in Elis, Greece, where the Olympic Games were held every fifth year in honour of Zeus (Jupiter) from the year 776 B.C., or even perhaps earlier. The victors were crowned with garlands of wild olive, and on their return home were the objects of remarkable demonstrations. The games included the customary features of an athletic gathering (racing, leaping, boxing, wrestling, throwing the discus, and so forth). The display in 1906 was witnessed by Edward VII., and competitors from all parts of the world took part in the different "events." At Olympia were the Olympieion, or temple of Olympian Zeus, containing a colossal statue of Zeus by Pheidias; the Heræon, dedicated to Hera, where a table stood on which the garlands of the victors were laid; the Pelopæion, the Metróon, the temple of Aphrodite, and the treasury, where dedicatory offerings were stored. During the excavations conducted by the German Government between 1875 and 1881 the *Hermes* of Praxiteles and several other treasures of art were found.

Olympiad, in the ancient Greek calendar, was a period of four years, the interval which elapsed between two successive celebrations of the Olympic Games. This mode of reckoning was largely literary, and never came into vogue for coins. Sometimes instead of being alluded to by its number the Olympiad was named after the winner

of the foot-race. Thus the first term of which there is a record (July, 776 B.C.) is often described as the Olympiad of Coræbus.

Olympias, wife of Philip II., king of Macedonia, and mother of Alexander the Great. When Philip married a second time she is alleged to have instigated his assassination (337 B.C.) and procured the murder of her rival Cleopatra and her daughter. She also succeeded in dethroning Alexander's successor, but was subsequently captured and put to death by Cassander, son of Antipater, and other generals of Alexander (316).

Olympus, a chain of mountains between Thessaly and Macedonia. Its topmost peak, upwards of 9,000 feet high, was sacred to the Greeks as the abode of the gods. Pine forests clothe its summit; its sea-front is broken by vast precipices.

Om, a Sanskrit word of unknown origin, round which (both in the Hindu religion and in Buddhism) gathered associations of a sacred but somewhat vague character. At first it was an emphatic mark of assent; at a later period it symbolised the Hindu Trinity, and it has been common to utter the mysterious syllable on various solemn occasions.

Omagh, chief town of county Tyrone, Ireland, on the Strule, 34 miles S.E. of Londonderry. It has a quaint market-place, a fine Roman Catholic Cathedral, and a Court House with Grecian façade. The industries are mostly concerned with the linen trade. When it was evacuated by James II.'s soldiers in 1689 it was partly destroyed by fire and again in 1743, but it is now a well-built and thriving town. Pop. (1901), 4,789.

Omaguas, South American aborigines on the left bank of the Marañon (Upper Amazon), within Peruvian territory as far as the Itaya confluence north of the Cocomo and Iquito tribes. Although half-civilised, the Omaguas still retain the formerly widespread custom of artificially modifying the shape of the skull by compressing it during infancy between wooden boards. The Omaguas are descendants of the historical Anahmacas, who during the first period of the Spanish conquest were reported to be a rich nation with a great and wealthy capital, residence of the fabled El Dorado ("The Golden One"). They are, however, gradually disappearing, and very few full-blood Omaguas are now met with; the half-breeds are distinguished by round flabby features, with a heavy inanimate expression.

Omaha, capital of Douglas county, Nebraska, United States, on the right bank of the Missouri, 492 miles W. by S. of Chicago. Founded in 1854, the town has many fine buildings, among them the Court House, City Hall, Public Library, Coliseum (a "Convention" building to seat 12,000 persons); the Roman Catholic and Episcopal Cathedrals, Omaha Medical College and Omaha University. The chief industries include meat-packing, silver-smelting, brewing and distilling, and there are also manufactures of linseed-oil, white lead, locomotives and machinery. Pop. (1900), 102,555.

Omahas, North American aborigines, a branch of the Siouan (Dakota) family, whose domain formerly comprised the lower course of the Platte River and most of the Elkhorn Valley, in what is now the state of Nebraska. But according to the national traditions they came originally from the district afterwards occupied by the city of St. Louis, and this confirms the view that the Siouan migrations were from east to west, not west to east, as was commonly supposed. The Omahas were not members of the Dakota Alliance, with which they were often at war. Since 1845 most of them have been confined to the Omaha and Winnebago Agency, Nebraska, where they have taken to agriculture, abandoning most of their old pagan usages. Though they show a slight tendency to increase, their numbers are still small (1,157 in 1900).

Oman, a state or sultanate of Arabia, occupying the south-eastern coast of the peninsula, bounded on the W. by Hadramut, on the N. by the Rhoba el Khali, or Dehna desert, on the E. by the Gulf of Oman, and on the S. by the Arabian Sea. It has an area of about 77,000 square miles. It is a mountainous district, of which the chief range is the Jebel Akhdar, 6,000 feet high. The hills run roughly with the coast and cut off the interior from the harbours. The wadys, or valleys, that pierce the hills and provide access to the sea, though mostly dry throughout the year, are fertile and well cultivated. The tamarisk, oleander, euphorbia, acacia, rhamnus, and milk bush are characteristic flora. The Arabs here are expert cultivators of the soil and, besides grain and vegetables, raise quantities of fruit such as the date, vine, peach, apricot, orange, mango, and melon. The rich oasis of Tyin, the villages of which are encircled with orchards and palm groves, is the garden of Oman. Muskat, the capital, is the only good harbour. Gwadar, a small port on the opposite shore of Makran, is a dependency of Oman. Pop. estimated at 1,000,000.

Omar Khayyám (OMAR THE TENTMAKER), the astronomer-poet, was born near Nishapur, Persia, about the middle of the 11th century, and was contemporary with Nizam-ul-Mulk and Hasan ibn Sabah, founder of the Assassins. When the former became vizier to Sultan Alp-Arslan he provided for his friends, giving Omar an annual pension. Omar became an eager student of astronomy and mathematics, wrote a treatise on algebra, and at the invitation of the Sultan Malikshah introduced a new calendar, the Jaláli, or Seljuk era, which began from March 15, 1079. He is now, however, chiefly remembered as a poet, owing to the translation and amplification of his *Rubáiyát* (quatrains) by Edward Fitzgerald, first published in 1859. Omar died about 1123.

Omar Pasha, whose real name was MICHAEL LATTAS, general, was born at Plaski, in Croatia, about 1810. He escaped from the military school at Thurn to Bosnia, where he became a Mohammedan and teacher of penmanship to the heir to the Turkish throne. When his pupil Abdul-Medjid became Sultan of Turkey Omar was given high

rank in the army, and in 1842 was named governor of Lebanon. Next year he rendered important service by putting down an insurrection in Albania, and in 1853 successfully defended Wallachia against the Russians, whom he also repulsed in 1855 at Eupatoria in the Crimea, where he was Turkish Commander-in-Chief. His last services were in Bosnia and Montenegro, in 1861-62, and he died on April 18th, 1871.

O'Meara, BARRY EDWARD, son of Jeremiah O'Meara, was born in Ireland in 1786. He entered the army as assistant surgeon in 1804; was senior medical officer in 1807, but was dismissed from the service in the following year for being involved in a bloodless duel at Messina between two officers, his colonel being determined in his efforts to suppress duelling. O'Meara then became a naval surgeon and was on board the *Bellerophon* in that capacity when Napoleon surrendered to Captain Maitland in 1815. He attracted the Emperor's notice and when his own surgeon refused to follow him to St. Helena, Napoleon asked that O'Meara might be appointed. Sir Hudson Lowe, anxious to be acquainted with his captive's private conversation, recommended that O'Meara's salary should be increased and a friendly understanding was arrived at. But after a time Lowe had to reprimand him for irregularities and the confidential reports ceased. O'Meara then sided with Napoleon in his quarrels with the Governor and in July, 1818, Government dismissed him. On his return to England, as he had insinuated Napoleon's life was not safe, the Admiralty removed his name from the list of naval surgeons. In 1822 his *Napoleon in Exile* was published and created a sensation, but while the most interesting part of the work is the record of the Emperor's conversations, that which made it immediately popular was its onslaught on Government and Lowe. It was not until 1853 that the publication of Lowe's journals proved O'Meara was led into grave exaggeration by his personal antagonism to Sir Hudson. O'Meara, who was twice married, died in London on June 3rd, 1836.

Omen, among the ancient Romans, signified a token of good or ill fortune. The belief in omens was so widespread that in other and more superstitious days it was necessary, in times of crisis, to counteract anything that might be taken to pre-empt disaster. For instance, when Julius Cæsar stumbled and fell as he landed at Hadrumetum (Susa in Tunis)—which he knew his soldiers were sure to consider as of evil augury—he had the presence of mind at once to exclaim, "Thus do I take possession of thee, O Africa!" A similar accident befell William the Conqueror when he touched shore at Bulverhithe, but he turned it off glibly with a like ejaculation—"I have taken seisin of this land with both my hands." *Abisi omen*! a familiar classical expression, meaning "May the omen fail!" indicates how common was the childish faith in omens.

Omnibus (Latin, "for all"), a long, four-wheeled public conveyance, with accommodator inside and outside for passengers. Omnibuses

were first used in Paris in 1828. In the following year they were introduced into London by George Shillibeer (1797-1866), the first pair starting from the "Yorkshire Stingo," Marylebone Road, on July 4th, 1829. They were drawn by three horses abreast, and ran between the "Yorkshire Stingo" and the Bank of England, carrying twenty-two passengers (all inside); the fare was a shilling, or sixpence for half the distance, including the use of a newspaper. In 1849 the number of inside passengers was reduced to twelve, provision being made for two on the outside. The "knifeboard," a double bench down the centre, with a common back for the seats on each side, was introduced in 1857. Its place has been taken by rows of seats facing the same way as the driver, or what are often called "garden" seats. Omnibuses were introduced into New York soon after their first appearance in London, and are now to be found in even the smaller towns in different countries. When the competition of the electric trams threatened to become serious, all danger of the extinction of the older-fashioned bus was averted by the introduction of motor-omnibuses, which, by 1906, had become one of the most familiar, if also the ugliest and not the least dangerous, features of the vehicular traffic of London and other populous towns.

Omsk, chief town of the province of Akmoinsk, West Siberia, Russia in Asia, situated at the junction of the Om and the Irtysh. It was originally founded (1716) to hold the Kirghiz in order, and then became the capital of West Siberia, being now the capital of the General Government of the Steppes. It is also the seat of the Bishop of Omsk. The industries are insignificant, and comprise tanning, candle-making, and saw-milling. It is, however, an important emporium of trade, since it lies on the Siberian Railway and is a river port with considerable traffic. Pop. estimated at 45,000.

Onega, the second largest lake in Russia. It is situated in the government of Olonetz, to the north-east of Lake Ladoga, from which it is 85 miles distant. It is 145 miles long, has an average breadth of 50 miles, has an average depth of 240 feet, and covers an area of 3,765 square miles. It receives the Vodla, Vytegra, and other streams, and drains by the Svir to Lake Ladoga. Its coastline is extremely irregular, especially in the north-east, where it is much indented. Its waters are clear and abound with fish. It is icebound for five months in the year, but in the open season is busy with traffic. By means of river, lake, and canal, Onega communicates with the basin of the Volga.

Oneidas, one of the original Five Nations of the Iroquois Confederacy, whose territory lay to the south-east of lakes Erie and Ontario, in the area now occupied by the states of Pennsylvania and New York, where the name still survives in Lake Oneida and some other local geographical terms. The nation itself numbered 3,264 in 1900, all confined to reservations partly in Canada (Thames River and Grand River Reserves), partly in New York and Wisconsin (Green Bay Agency),

excepting a few at schools in Carlisle (Pennsylvania) and Hampton (Virginia). The increase has been considerable since 1782, when they had been reduced to 300 during the revolutionary war, in which they sided with the British.

Onion (*Allium Cepa*), a vegetable belonging, like garlic, leeks, and shallots, to a lilaceous genus. It has large, hollow, rush-like leaves; a globose umbel of greenish-white, hexamerous, polysymmetric flowers with a membranous spathe; and a tunicate bulb. The pungent smell and taste are due to a small quantity of a volatile oil containing a large proportion of sulphur. The onion is probably a native of south-west Asia from the Punjab to Palestine, and has been valued as an article of food from ancient Egyptian and Homeric times. Its name, derived from the Latin *unio* (a pearl), through the French *oignon*, alludes probably to the bulb growing singly, unlike the cloves of the garlic. When less than 6 inches high, the whole plant is eaten as salad; small bulbs are pickled in vinegar, larger ones are boiled, stewed, or fried, or when scorched are used as colouring for soups. Those grown in Spain and Portugal are larger and milder than English ones. They are commonly eaten raw with bread and cheese by the Portuguese and Spanish peasants, and are wholesome, nutritious, and easily digested. They are esteemed in medicine, being popularly supposed to relieve colds, and to have a stimulating effect on the system, while the pulp of a roasted onion applied with olive oil makes a useful poultice in suppurating tumours, and the acid of the juice is said to dissolve stone in the bladder.

Onondagas, one of the Iroquois Five Nations, who occupied a considerable territory south of Lake Ontario, about Lake Onondaga (named from them) in the state of New York. They number about 1,000, some in Grand River Reserve, Ontario, some in the Onondaga, Allegany, Cattaraugus, Tuscarora and Tonawanda Reserves, New York.

Ontario, the smallest and most easterly of the five great lakes between Canada and the United States, having the river Niagara and its falls at its western end, and the St. Lawrence as its eastern outflow. In area it is 7,240 square miles, is 190 miles long, 55 miles at the broadest part, and its mean depth is about 300 feet. It is never frozen except near the shores, which are, generally speaking, flat and uninteresting. Navigation is dangerous, owing to the prevalence of violent storms. The chief ports are Hamilton, Toronto, Port Hope, Cobourg, and Kingston, near which the scenery is beautiful. Lake Ontario is connected with Lake Erie by the Welland canal, and with the Hudson river by the Oswego canal.

Ontario, a province of Canada, bounded on the N. by Keewatin and James Bay, on the N.E. and E. by Quebec and the Ottawa, on the S. by the St. Lawrence and the Great Lakes and on the W. by Manitoba. It occupies an area of 222,000 square miles. A chain of hills extends from near Kingston to the shores of Georgian Bay, opening into Lake Huron;

elsewhere the surface is gently undulating. The chief rivers are the Ottawa, which divides the province from Quebec, and the St. Lawrence whose upper course separates Ontario from New York State. Lake St. Clair lies between Ontario and Michigan; and among inland lakes the chief are Lakes Simcoe, Muskoka, Nipissing, Nipigon, Lac des Mille Lacs, and Lake of the Woods. Both agriculture and manufactures are in a flourishing condition. Wheat, oats, barley, peas and beans, potatoes and rye are the principal crops, and fruit and vegetables are largely grown. Dairy farming is conducted on the greatest scale in creameries and factories. Cattle, horses, sheep, pigs, and poultry are raised on the most extensive scale. Nearly two-thirds of the population are engaged in one branch or another of farming. Iron, copper, lead, and building stone abound; as also marble, gypsum, and other minerals; while gold and silver are obtained in the north-west. There are very prolific petroleum wells in the south-west, salt wells on the shores of Lake Huron, and immense deposits of nickel at Sudbury. Water-power is largely used for manufactures, which include railway stock and implements, cotton and woollen goods, iron and hardware, paper, distilleries and breweries, and agricultural tools and machines. The fisheries, all freshwater, are of considerable value, including trout, whitefish, herring, and sturgeon, and the timber resources are enormous, white pine and spruce being economically the most important, and the maple the typical tree. Internal communication is well provided for by the Grand Trunk, Canadian Pacific, Canada Atlantic, and Michigan Central Railways, an extensive canal system—in the construction of which some remarkable feats of engineering were accomplished—and the lakes. The schools under the Minister of Education are supported by a property tax, and are free to all. Protestant Dissenters, especially Methodists, form the bulk of the population. Toronto (208,040) is the largest town and the capital of the province, the only others of any size being Hamilton (52,634) and London (37,981). Ottawa (59,928), in the north-east, is the seat of the Dominion Government. Ontario is administered by a Lieutenant-Governor, assisted by an executive council and a Legislative Assembly elected every four years. The province is represented in the Dominion Parliament by 24 members of the Senate and 86 in the House of Commons. Pop. (1901), 2,182,947.

Onus probandi, a Latin phrase meaning "the burden of proving." As a rule, the responsibility for establishing a case rests with the person making a charge or allegation, and rightly so. Even when a public body or official undertakes prosecution this duty is still thrown upon it, since it has merely taken the place of the pursuer or plaintiff. In cases, however, where a charge has been made against a person who has peculiar and exceptional knowledge of the facts and of whom disclosure may reasonably, if not compulsorily, be expected, the *onus probandi* may be transferred to him. The phrase is applied to the conduct of general as well as legal argument.

Onychoteuthis, one of the best-known genera of calamaries or squids. It belongs to the family Teuthida. It includes several species common in the North Atlantic, where they are sometimes found very far from land.

Onyx, from a Greek word meaning a finger-nail, referring to the contrasting bands of colour, is the name of that variety of agate in which the variously-coloured layers are evenly parallel and alternate white or grey with black. If the stripes alternate with brown sard or red carnelian, the stone is termed a sardonix. Oriental onyx has long been exported from Broach and Cambay. At one time the stone used to be obtained from the Galgenberg, at Idar, in Birkenfeld (Oldenburg), where it is still cut, polished, and artificially heightened in colour, but the raw material now comes from Uruguay. Onyx is chiefly employed for cameos and intaglios, as brooches, rings, etc. In ancient times banded varieties of stalagmite, now known as onyx-marble, were also termed onyx.

Oolachan. [CANDLE-FISH.]

Oolite, or ROE-STONE, a limestone made up of rounded concentric grains resembling the roe of a fish, each grain being formed round a minute grain of sand, fragment of coral, shell, or other body. It would seem to have originated in lagoons or enclosed areas of sea, where the water could become concentrated and gentle currents keep the grains in motion. Some Carboniferous limestone is oolitic; but the limestones of the English Jurassic rocks are so markedly oolitic as to be often termed the Oolites. Bath-stone is very typically oolitic. When the grains are as large as peas, the rock is called a pisolite or pea-grit, which is much less common.

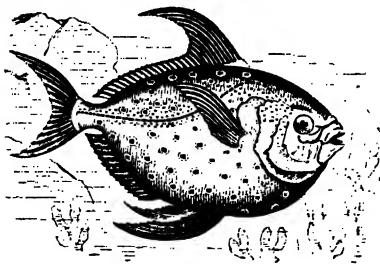
Oophore, or OOPHYTE, the stage in the life-cycle of one of the higher plants that bears the sexual organs. Thus, in mosses, ferns, and flowering plants, which are grouped together as Archegoniata, because they have the oosphere enclosed in an archegonium, there is a more or less distinct alternation of generations, the sexual oophore and the asexual sporophore. In mosses the oophore stage is the conspicuous leafy plant; in ferns and their allies [PTERIDOPHYTES] it is the small and generally transient prothallium, and in flowering plants [PHANEROGAMIA] it is further reduced to the archisperm and the "included cells" of the pollen-grain, mere parts of the female and male spores.

Oospore, the fertilised oosphere or germ-cell, differing in most groups of plants from the unfertilised condition in the possession of a distinct cell-wall. The term is specially employed with reference to those Thallophytes in which the germ cell is dissimilar to the sperm cell (being larger), but is not surrounded by a complex envelope or carpogonium. Thallophytes of this grade, including such algal forms as Vaucheria and Fucus and such Fungi as Saprolegnia and Peronospora, were classed together by Sachs as Oosporeae.

Ootacamund, or **UTAKAMAND**, a town of the Neilgherry Hills District, Madras Presidency, India, 260 miles S.W. of Madras. It is the principal sanatorium of the Presidency, lies at a height of 7,228 feet above the sea, and has an average annual rainfall of 46 inches. Close by are the Neilgherries, formed by the junction of the Eastern and Western Ghats, which reach in Dodabetta Peak an elevation of 8,760 feet, while Elk Hill and four other points exceed 8,000 feet. The town is situated in an amphitheatre surrounded by mountains and adorned by an artificial lake. The vegetation is varied and luxuriant, and every facility exists for the pursuit of a healthy outdoor life. The Botanical Gardens were opened in 1842-3 during the Governorship of the Marquis of Tweeddale. There are two other gardens, one of which (the Barlujar) is devoted to the culture of ipecacuanha. The Lawrence Asylum was founded by Government in 1858, and the Public Library dates from 1859. Pop. (1901), 14,500.

Ooze, a fine calcareous deposit covering extensive areas of the bed of the ocean. It occurs at depths of 2,000 feet and upwards, and consists of the remains of tiny organisms, but especially of the shells of Foraminifera. The ooze most naturally met with up to a depth of 12,000 feet is the white deposit composed of Globigerina shells. This, at greater depths, is replaced by what is called the Red Clay ooze. During the explorations of the *Challenger* a Radiolarian ooze was found at a depth of 4,575 fathoms. In some areas shells of Diatoms and Pteropods are the chief constituents of the ooze. A vast quantity of the organisms sinking to the bottom serves as the food of deep-sea animals. The ooze, in its earliest stages, has a pasty consistency, which gradually hardens and solidifies as the superincumbent weight increases and, in the course of untold ages, becomes converted into chalk.

Opah (*Lampris luna*), a large deep-sea fish, from the North Sea and the Atlantic, constituting a genus of the Acanthopterygian family Coryphænidæ. The body is deep and compressed from side



OPAH (*Lampris luna*).

to side; the tail deeply forked; and the pectorals, ventrals, and the forepart of the dorsal fin are sickle-shaped. It attains a length of four feet, and is brilliantly coloured. The back is bluish-green, the sides are violet blending into the red of the

under surface, round silvery spots are scattered over the body, and the fins and tail are scarlet. The flesh is reddish and is said to be excellent in flavour. It is sometimes called the sun-fish, and has other local names.

Opal, the hydrous form of silica, containing from 3 to 13 per cent. of water. It is amorphous, having apparently consolidated from a gelatinous state, and, from the unequal strains induced in this consolidation, behaves with reference to polarised light like a doubly-refracting crystal. Its hardness is 5.5-6.5 and its specific gravity 1.9-2.3. It may be opaque or subtranslucent, one of the latter varieties, the precious or noble opal, exhibiting a beautiful play of iridescent colours. These are explained as due to interference produced by thin included films. It occurs, in veins in trachyte, in Hungary and Honduras; and in ironstone nodules in Queensland; and is a valuable gem. Hyalite is a transparent, colourless variety; fire-opal, a transparent, red or yellow one; common opal gives no play of colour; and menilite, or liver-opal, from Ménilmontant, near Paris, is opaque and brown or grey. Of the less translucent varieties of semi-opal, the most interesting are wood-opal, replacing particle for particle the tissues of fossil plants, and geyselite or siliceous sinter, deposited by the heated waters of geysers.

Opatas (ONAVAS), a Mexican people, formerly very numerous and powerful in the state of Sonora, where they reached as far as the crests of the western Sierra Madre, being here coterminous with the Tarahumaras. They comprised four main groups:—(1) The Tehmes, in the Cucurpe, Sonora, and Matape river valleys; (2) the Tehuimas, mainly in the Sonora valley and about the headwaters of the Rio Grande; (3) the Caguinachis, "Highlanders" in the Saguarija spurs of the Sierra Madre; (4) the Jovas, between the Tehuimas and Caguinachis. At present all are settled in pueblos (rural villages); hence they are called "Pueblo Indians" to distinguish them from the neighbouring nomad wild tribes. But they are entirely distinct from the true Pueblo Indians of Arizona and New Mexico, and in appearance resemble the Aztecs and other Nahuas, being short, thick-set, with flat oval features and dark brown colour. But the language shows Pima affinities, the two forming the so-called Opatá-Pima family, extending far into the state of Durango. In the wars of the Conquest the Opatas were conspicuous for their stubborn resistance to the Spaniards, and in more recent times they were chiefly instrumental in breaking the power of the fierce Apache nomads. Now they are peaceful agriculturists, gradually merging in the half-caste Mexican population.

Opera (Italian *Opera*, abbreviated from *Opera in musica*, "musical work"), a drama which is acted and sung to the accompaniment of a full orchestra. It was the outcome of the efforts made at Florence, towards the close of the 16th century, to revive the musical declamation of ancient Greek tragedy. The first genuine Italian opera performed in public was *Euridice* (1600). The success in recitative (*stilo rappresentativo*) which marked

this opera, the joint production of Peri and Caccini, was even more conspicuous in the *Orfeo* (1608) and other works of the Mantuan Monteverde, who also enlarged and improved the orchestra. Cavalli relieved the monotony of perpetual recitative by a free use of rhythmic melody and Scarlatti still further elaborated the use of the aria. Somewhat earlier than this, a native form of opera had taken root in France. Its founder was Lulli, who devised a style of recitative eminently adapted to the best French poetry, and at the same time gave a new and richer character to the overture. The English opera, which originated in the masque, enjoyed a short period of vitality during the brief career of Henry Purcell. The Italian opera was introduced into Germany in 1627, and maintained its ascendancy till 1678, when Theile's *singspiel*, *Adam und Eva*, was performed at Hamburg. But the true originator of the German opera was Keiser, who between 1694 and 1731 composed about 120 pieces for the Hamburg Opera House. The English career of Handel, the bent of whose genius drew him to the Italian school, opens with the representation of *Rinaldo* at the Haymarket (London) in 1711. He was the only



GIUSEPPE VERDI.

composer of the period who succeeded in overcoming the difficulties caused by the formal restrictions which prevailed as to the distribution of voices and order of parts. Contemporary with Handel were Hasse and Fux, who maintained Italian traditions at Dresden and Vienna. In Italy, meanwhile, the intermezzo between the scenes of the Opera Seria had grown into the Opera Buffa or comic opera, and the two now advanced side by side. The concerted finale of the latter was afterwards adopted in the Opera Seria also, thus giving rise to trios, quartets, and various rich and dignified *pezzi concertati*. A new era opens with the revolutionary activity of Gluck, who in the latter part of his career endeavoured to remodel the lyrical drama in accordance with its proper functions, subordinating music to dramatic action and abolishing the stereotyped form of aria. He met with some success in Paris, where his *Iphigénie en Aulide* appeared in 1774, but eventually his canons had more influence on German than on French opera. To Cimarosa (1751-1801) Italian opera, both of the serious and comic kind, owed more than to any of his countrymen, but he was far outstripped by Mozart, whose *Idomeneo*, *Nozze di Figaro*, and *Don Giovanni* hold the same rank among Italian compositions that belongs to *Die Zauberflöte* (1791) among those of Germany. Beethoven's *Fidelio* (1805), a work of a more serious cast than those of Mozart, is unique and unrivalled in its own sphere. The Romantic element, so

much in vogue in the early years of the 19th century, was introduced into German opera by Weber (1786-1826) and Spohr (1784-1859). The greatest composer of the Italian school in the 19th century was Rossini (1792-1868), who was followed by Bellini (1802-35), Donizetti (1798-1848), and Verdi (1813-1901); the last named, however, also showed himself, in *Otello* and *Falstaff*, a master of the later developments of opera, which were also exhibited in Mascagni's *Cavalleria Rusticana*. At Paris Gluck was succeeded by Cherubini, Spontini, Rossini, Halévy, and Meyerbeer, whose three great operas, *Robert le Diable*, *Les Huguenots*, and *Le Prophète*, appeared between 1831 and 1843.



CHARLES FRANÇOIS GOUNOD.

Later in the French school came Gounod's masterpiece *Faust*, besides his *La Reine de Saba*, *Mirville* and *Roméo et Juliette*, and Bizet's *Carmen*. Of the Russian school Glinka's *La Vie pour Le Tsar* and Peter Tchaikovsky's *Eugen Oneghin* may be cited as the best examples. In England the most considerable effort in modern times was Sir Arthur Sullivan's *Ivanhoe*. The last great name in the roll of opera-composers is that of Wagner (1813-83). He himself, however, rejected the title, which he regarded as associated with an undue prominence of the musical element. The ideal drama should, according to him, be the joint product of poetry, music, scenery, and action, and none of these factors can be sacrificed to the others without an injurious effect on the common result. This is the great idea which underlies the "music dramas"—*Tristan und Isolde* (1865), *Die Meistersinger von*

Nürnberg (1868), *Der Ring des Nibelungen* (1876), and *Parsifal* (1882). Wagner's influence is still paramount, and his theories are likely to lead to new developments in operatic composition.

Opera-glass (Galileo's telescope) is a form of telescope, but, as its name implies, is chiefly used to render scenery or persons on the stage of a theatre more distinct. It consists of an achromatic object-glass, which would naturally form a real inverted image of the object. The rays are, however, intercepted by the eyepiece before they can form that image, and the eyepiece being a concave achromatic lens forms a magnified erect image of the object which the observer sees. The special utility of the instrument is that it gives at once an erect image without any contrivance for reinversion, and its size is so convenient that it is easy to hold and control.

Operculata, a group of land shells which are distinguished by the possession of a hard plate, which closes the mouth of the shell, similar to that of many marine Gasteropoda, such as the periwinkle (*Littorina littorea*). The only English species, *Cyclostoma elegans*, is common in limestone districts in the south of England.

Operculum, the name of the calcareous or horny plate used to close the mouth of the shell of the mollusca of the group Operculata.

Ophicalcite, a crystalline limestone containing spots, veins, or interlaminae of serpentine, as in the so-called serpentine marble of Ballynahinch (county Down, Ireland) and the Eozoon limestone of the Archæan rocks of Canada. Its exact mode of origin is obscure, the alteration of a magnesian limestone containing silica, and that of a limestone interpenetrated by contact-action with magnesian lava, having both been suggested.



OPHICLEIDE.

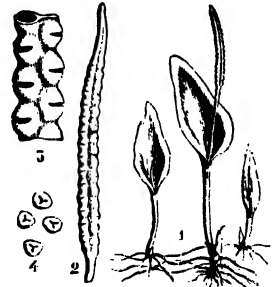
Ophicleide, a bass wind-instrument of metal developed from the wooden Serpent towards the close of the 18th century. It has a tube of conical bore with a bell like that of a horn, a cup mouthpiece, and (commonly) eleven keys, which control vents in the side of the tube, giving it a compass of over three octaves.

Ophidia. [SNAKES.]

Ophioglossum, or ADDER'S-TONGUE, a genus of Pteridophyta forming, with the moonworts (*Botrychium*), the class Ophioglossaceæ, which, though commonly classed with ferns, differ from them in several important structural characters. The genus includes a small number of species, two of which are British, scattered over most of the globe, none over a foot in height. The prothallium is subterranean, destitute of chlorophyll, tuber-like, and monœcious. The antheridia and archegonia are both deeply sunk in its surface. The stem of

the sporophore stage is very short, unbranched very slow in growth, containing no sclerenchyma and having a three-sided apical cell. A very few leaves are produced

singly from the stem and from below each an unbranched root also with a three-sided apical cell. These roots sometimes bear adventitious buds. The leaves are not circinate in vernation. Each of them branches into a barren and a fertile lobe. The former is a leathery, ovate, sheathing, net-veined



OPHIOGLOSSUM.

1. Complete plant. 2. Fructification, leaflet; and the latter a spike-like "fructification," along which the sporangia originate endogenously in two rows, each from a group of cells (eu-sporangiate).

Ophir, a region to which frequent allusion is made in the Old Testament. It furnished gold, sandal-wood, etc., for the temple of Solomon, whose ships journeyed thither from the ports of Edom. Modern scholars differ as to whether it was situated in India, in Arabia, or on the east coast of Africa, although, on a review of the evidence, it seems probable that the site of Ophir will be found in south-east Arabia, possibly in proximity to the Gulf of Oman, or the Gulf of Persia.

Ophthalmia. [CONJUNCTIVITIS, EYE.]

Ophthalmoscope. This instrument is used for the examination of the fundus or back part of the interior of the eye. On looking at the transparent cornea the details of the interior of the eye are not visible, for, inasmuch as the head of the person making the examination is interposed between the source of illumination and the objects lying at the back of the eye, there is not sufficient light returning from the latter to render them visible, and all that is seen is the darkness of the pupil. By means of a mirror perforated in the centre, light can be reflected into the eye, and at the same time the observing eye, placed behind the hole in the mirror, can be made to receive the returning light from the eye which is being examined. This principle was first utilised (1847) by Charles Babbage, but Helmholtz, in 1851, was the first to realise its important applications. There are two methods of using an ophthalmoscope. In the indirect method, a convex lens is interposed in front of the eye examined, and the examining eye, situated some two feet from the eye observed, views an inverted image of the interior of the latter. In the direct method the examining eye is placed within a few inches of the eye examined, suitable lenses are made to slide in front of the aperture in the mirror, to correct, if need be, any error of refraction in the eye of either the patient

or operator, and an erect image of the fundus of the observed eye is presented for examination. The ophthalmoscope has two main uses; in the first place, it is of great importance in medicine, as by means of it diseased conditions affecting the fundus of the eye can be detected. Such conditions are often a valuable guide in the diagnosis of disease. Optic neuritis, retinitis, and chorioiditis, diseases affecting the fundus and readily distinguished by the ophthalmoscope, are far from being of merely local importance. The second great use of the ophthalmoscope is in the detection of errors of refraction.

Opie, JOHN, painter, was born at St. Agnes, near Truro, Cornwall, in May, 1761. As a boy he evinced a marked talent for mathematics, but himself preferred drawing and, being befriended by Wolcott ("Peter Pindar"), was enabled to enter upon the career of an artist. A kind of working partnership was set up between them, which lasted till they settled in London (1781). In 1782 he began to exhibit at the Royal Academy, became an Associate in 1787, and a full member in the following year. In 1805 he was elected Professor of Painting to the Royal Academy, and lectured with conspicuous acceptance to the students till his death, in London, on April 9th, 1807. His lectures appeared in volume form. Among his historical pictures may be named "The Assassination of James I. of Scotland" and "The Death of Rizzio," both at the Guildhall, London; "The School," belonging to Lord Wantage, is a fine example of Opie's earlier manner; and his most successful portraits included those of Dr. Johnson, Hannah More, Charles James Fox, Priestley, and Lady Hamilton. His second wife, Amelia Alderson (1769-1853), became a prominent member of the literary society of her time and, till she turned Quaker in 1825, wrote several novels that were very popular. Her poems and hymns also attained to considerable vogue. She was benevolent and charitable and a favourite with all who knew her.

Opisthobranchia, a sub-order of Gastropoda, including the sea-slugs (*e.g.*, Doris, Eolis, Elysia), the Sea-hare (Aplysia), and the Bubble-shells (Bulla). The shell is usually absent; if present, it is internal and rudimentary. The principal character, and that to which the name is due, is that the gills or branchiae are at the hinder end of the body, and always behind the heart. The animals are all marine and there are but few species known as fossils.

Opitz, MARTIN, poet, "the Swan of Silesia," was born at Bunzlau, Silesia, on December 23rd, 1597. He enjoyed great reputation as a writer of didactic poetry. His *Buch von der deutschen Poesie* has been held to date the beginnings of modern German poetry, although it must be said that his muse was mechanical and lacking in emotion. Opitz was protected by several of the minor princes of Germany, especially Count von Dohna, and was ennobled and given the poetic crown by the Emperor Ferdinand II. In 1622 he was invited to Karlsburg (or Weissenburg), in Transylvania, by Bethlen

Gabor and appointed to the chair of philosophy; after his return to Germany he became historiographer of Poland. He died at Danzig, on August 20th, 1639.

Opium. This well-known drug and narcotic consists of the dried juice obtained from the capsules of the opium poppy (*Papaver somniferum*). Incisions are made in these capsules, and the juice which exudes is, when dry, scraped off and collected. The plant is cultivated very largely in Eastern countries, notably in Asia Minor, Persia, Egypt, India, and China, while it has also been successfully grown in the west of Europe. Its properties as a narcotic appear to have been known from very early times, and its use is mentioned by some of the classical writers. In India the cultivation is a Government monopoly, and yields a revenue of over £6,000,000 a year. Large quantities were supplied to China, and disputes in the opium traffic led to the Chinese War, which was concluded by the treaty of 1842. A large quantity is still shipped to China from India, but the Chinese growth is now very successfully competing with the imported article. The physiological properties of opium are chiefly due to the alkaloids which it contains. Of these the most important is morphine, which is present to the extent of from 3 to 17 per cent. Others are also met with to a small extent—*e.g.*, narcotine, narceine, codeine, thebaine, papaverine, and meconic acid, of which the first three are used medicinally. It also contains a resinous substance and some other compounds of undetermined composition. The habit of opium-smoking is largely practised in China, a specially prepared extract of opium being employed. With regard to the effect of the habit little difference of opinion exists. While the moderate use of opium may possibly have no deleterious effects, yet if carried to excess it undoubtedly produces nervous and physical debility, and may completely ruin the constitution and mind of the victim. There can be no question, therefore, that the habit is pernicious and should never be acquired. Opium-eating, practised in India, Persia, and Asia Minor, appears to be even more injurious, and, as in the case of smoking, the habit when once contracted is exceedingly difficult to break off. [LAUDANUM, MORPHINE.]

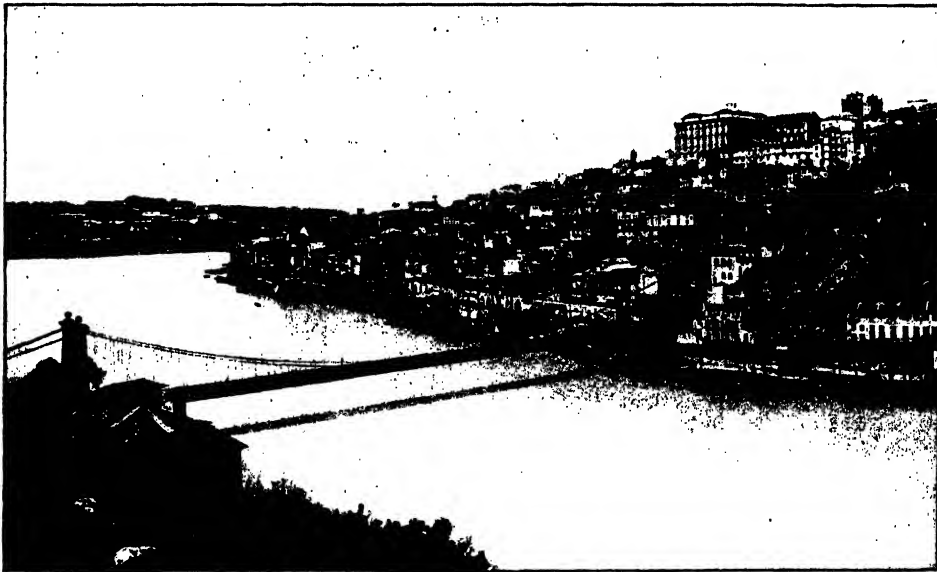
Uses in Medicine. Opium is applied externally in the form of liniment and plaster for the relief of pain. Internally administered, it diminishes the amount of the secretions, acts as an astringent, and diminishes the peristaltic movement of the bowels. When absorbed into the system, it has a specific action upon the brain, producing in small doses a kind of intoxication, and in larger doses depression, amounting in the case of poisonous doses to actual coma. The drug causes contraction of the pupil, and depresses the respiratory functions. Its most valuable use as a medicinal agent is as a narcotic; it is also employed in some cases of hæmorrhage and in certain intestinal disorders. The best known preparations are the tincture (laudanum), the compound camphor tincture (paregoric), the compound kino powder, Dover's powder,

and aromatic chalk powder, various pills containing opium, and the vinum opii. The action of opium depends mainly upon the morphine it contains, and the hypodermic injection of morphine is now frequently used in cases in which in former days opium would have been administered. Codeine is sometimes employed in the treatment of diabetes. Apomorphine is sometimes used as an emetic.

Opium Poisoning. The symptoms of this condition are coma, with contracted pupils and stertorous breathing. The treatment consists in making every effort to arouse the patient in the interval which elapses before medical assistance can be procured. If the poisonous dose has been swallowed, it is important that the contents of the stomach should be evacuated as soon as possible.

Opoponax, a gum-resin derived from the roots of a plant of the genus *Opoponax*, of the tribe *Peucedanææ*. The plants are umbelliferous and their fruit has many oil-tubes. They grow in the Levant and the south of Europe generally. The

the hands of Dom Miguel, by whom the city was besieged in 1832-33. The cathedral was built by Henry the Navigator. There are several other interesting churches, amongst them the Church of Cedofeita (founded in 559) and the Church dos Clerigos, with a tower 246 feet high. Some of the old monasteries are now used as barracks and for a citadel and exchange. Among the fine buildings are the royal palace of Torre da Marca, a Crystal Palace, the Hospital of St. Antony, and an English factory erected in 1788. There are also a good library, a medical school, and a fine art academy. From Oporto are exported port wine, fruits, cattle, onions, cork, copper, hides, and wool. The chief industries are shipping and the manufacture of silks, woollens, and other textiles, tobacco, sugar, and paper, as well as cork-cutting, sugar-refining, metal-casting, brewing and distilling. In the suburb of Villa Nova da Gaya, to the south of the Douro, are large wine cellars. The Douro is crossed by the Ponte de Dom Luiz Primeiro, an iron-girder railway bridge, 1,160 feet long, with a central arch of



Oporto.

juice was once employed medicinally as an antispasmodic, but is now seldom used excepting in Persia and other Eastern countries. *Opoponax* perfume is an essential oil distilled from one of the balsam trees.

Oporto ("the port"), the largest city of Portugal after Lisbon, beautifully situated on rocky ground above the right bank of the Douro. The Roman *Portus Cale* (whence Portugal) became later a Christian stronghold which was, however, sometimes in the hands of the Moors. The citizens opposed the French in 1808, and suffered much at

550 feet span, one of the most graceful structures in the world. In order to avoid the bar at the river mouth, which offers difficulties to the navigation of large vessels, a harbour has been constructed at Leixões on the coast, $2\frac{1}{2}$ miles north of the Douro. Pop. (1900), 172,421.

Opossum, an animal belonging to the Marsupial genus *Didelphys*, with twenty-three species, peculiar to America. There are five digits on each limb; the great toe is opposable, and the tail generally long, in part naked, and prehensile. The pouch is generally absent, rarely complete, and

sometimes reduced to two folds of the skin which cover the teats. The largest species is about the size of a big cat, the smallest very little larger than a mouse. They are nocturnal and arboreal in habit, and feed on small reptiles, birds' eggs, and insects. The typical species (*D. marsupialis*), which is also the largest, has the pouch complete. The colour is dirty-white, and there is a brownish circle round each eye. It has a wide range in America, and in the central and southern parts is called the Crab-eating Opossum, which has been



OPOSSUM (*Didelphys marsupialis*).

described (wrongly) as a distinct species. The expression "to play 'possum," meaning "to dissemble," derives its force from the fact that the opossum, when closely pressed, throws itself on its back and feigns death. In pouchless forms, like the Woolly Opossum (*D. lanigera*), the young are generally carried on the back of the mother, as they are sometimes in other species. With the opossums the genus *Chironectes* (with a single species, *C. palmatus*, the Yapock, ranging from Guatemala to the south of Brazil) makes up the family Didelphyidae. The Yapock, about the size of a rat, is grey marked with brown, has the feet webbed, and is aquatic in habit. The name of Opossum has also been given to certain of the Australian marsupials, but, to avoid confusion, it is usual to restrict it to the American forms, the only marsupials of the New World.

Oppeln, a town of Prussian Silesia, Germany, on the Oder, 50 miles S.E. of Breslau. The principal buildings are the Church of St. Adalbert, founded in 995, the ducal palace of the 15th century, now utilised for official purposes (the town being the seat of government for Upper Silesia), and the Town Hall. The manufactures comprise cement and lime, pottery, cigars, soap,

and leather, besides brewing and distilling. The town is an important agricultural centre for grain and cattle. Pop. (1900), 30,115.

Optical Illusions are produced when, owing to some peculiarity of the human eye, objects appear to be either in some place where they are not or to be different from what they really are. The phenomenon of persistence of vision, owing to which the impression on the retina of an object presented to the eye for a very short time remains for about one-tenth of a second, enables a number of illusions to be produced, as when a bright object rapidly swung round at the end of a string produces the effect of a continuous ring. If a number of different pictures, representing a moving object in different positions, are presented to the eye in rapid succession, and if a screen is interposed during the moment of change, the transition from one picture to the next is not noticed, and the figure itself seems to move; this is exemplified in the zoetrope and many similar devices, and especially in the cinematograph, which was invented by MM. Lumière, of Paris. If a disc having differently-coloured sectors is rapidly rotated, it will appear to be uniformly of a colour which is a mixture of the component colours. Two objects seen separately with the two eyes may appear to occupy the same space; if one looks down a tube with one eye and holds a solid object such as a brick near the other, it is not difficult to make it appear that there is a hole through the brick. If a bird and a cage are drawn near each other on a sheet of paper which is held close to the eyes, the cage will be really seen by one eye and the bird with the other, but the bird will appear to walk into the cage. Many illusions may be produced by reflections. When an object is placed near a concave mirror and screened from direct view, an image or ghost may be seen at a corresponding conjugate focus. When a sheet of clear glass is arranged across the stage of a theatre at an angle of 45° to the audience, an image of a figure behind the scenes will be seen on the stage; this was the principle of the "Ghost" which was associated for many years with the name of Professor Pepper (1821-1900), though it appears to have been the invention of Henry Dircks (1806-1873). If a coloured surface be viewed for a time sufficient to fatigue the retina, and if the eyes be quickly turned to a white surface, the latter will appear tinged with the complementary colour. The term optical illusion is commonly used to designate tricks rather than more important optical phenomena such as the mirage, which, of course, do really produce an illusory effect.

Optic Atrophy. This condition is detected by the altered appearance presented by the optic disc on ophthalmoscopic examination. The main symptom of the disease is failure of vision, and there is usually some alteration of the colour sense. Atrophy may be a sequel of optic neuritis, or may occur apart from previous inflammatory change. The latter form of atrophy is met with in locomotor ataxia, in syphilis, and in some other conditions.

The treatment of optic atrophy is, as a rule, unsatisfactory, cases tending to proceed from bad to worse. This shows the necessity of submitting a patient to the examination of an oculist without delay.

Optic Neuritis. Inflammation of the optic nerve is a condition readily detected by the use of the ophthalmoscope, which reveals the altered appearances manifested by the optic disc. In the normal condition the margin of the disc is clearly defined and not raised above the surface of the surrounding retina; in neuritis it becomes swollen and woolly-looking; the vessels coursing over it are tortuous, and in places obscured by effused material. Optic neuritis occurs in many forms of disease within the skull, and sometimes the detection of the altered appearance of the optic disc is of great importance in confirming the diagnosis of cerebral tumour or abscess, meningitis, etc. Optic neuritis also occurs in Bright's disease, syphilis, and as the result of the extension of inflammation from neighbouring parts of the eye.

Optics is the science which treats of the propagation of light, and is usually divided into geometrical and physical optics. Geometrical

can enter it at all, the rays are bent in accordance with the laws of refraction. Many problems of interest arise from a consideration of the paths of rays after reflection or refraction at plane or spherical surfaces. Of the greatest practical importance, however, are the problems relating to the behaviour of rays after refraction through translucent bodies known as prisms and lenses, since upon this behaviour depends the utility of the various optical instruments, such as the microscope, telescope, etc.

Optimism, the doctrine that this world is the best of all possible worlds; that good, at however distant a future, will overcome evil; the disposition to take the most hopeful view of things. The opposite doctrine is known as pessimism. The Platonists and Stoics among the philosophers of antiquity and Anselm and Aquinas in the Middle Ages held this view of optimism in different forms. In modern times it was developed by Descartes and elaborated by Gottfried Wilhelm Leibnitz (1646-1716), whose philosophy, though he left no systematic account of it, may be deduced from his writings, particularly from his *Essai de Théodicée sur la Bonté de Dieu*. Leibnitz's optimism is based upon the trilemma: if this world be not the best



OPTICAL ILLUSION : A MIRAGE.

optics treats of those simple laws of the propagation of light which have been experimentally established, and uses these laws in the solution of more complex problems; physical optics explains experimental facts by showing that they agree with certain hypotheses on the structure of matter and space. (For physical optics see LIGHT.) In elementary geometrical optics it is usual to consider light as emanating from a mathematical point and as being made up of rays extending in all directions. These rays always travel in straight lines through any one uniform medium, unless rays from different origins interfere with each other, as in the phenomenon of diffraction. When light falls on any object some of it is irregularly reflected or scattered in all directions, since the surface is not absolutely smooth, but composed of an infinite number of tiny excrescences; this scattering renders the object luminous and visible. From a smooth surface the rays are thrown back in one direction only and obey the laws of reflection. If the object is of such a nature that light

possible, God must either- (i.) not have known how to make a better (which contradicts His omniscience); or (ii.) not have been able (which denies His omnipotence); or (iii.) not have chosen (which doubts His benevolence). As a theist Leibnitz's argument involved the position that the forces of the universe are controlled by an All-wise intelligence. Pope, influenced by Bolingbroke, in his *Essay on Man* sought to "vindicate the ways of God to man" and to popularise the position that all is for the best in this best of possible worlds, which was ridiculed by Voltaire. It may be asked, Can moral evil and pain in the world be reconciled with the idea of a righteous ruler in heaven? Is pain the penalty of sin? Is happiness always the reward of goodness? Such considerations have always led thinkers to endeavour to fathom the mystery of the origin of evil. The story of Job is almost the oldest attempt at a solution, and the discussions to which the subject gives rise are as old as philosophy itself. If our intellect suffered no limitation, if we understood the whole plan of creation, we might

agree with Leibnitz that the existing universe is the best possible; that advance is being made towards a greater perfection. Until all the good of which this world is capable is realised, we can have but little knowledge of how desirable and beautiful a habitation it is. "Christian optimism," says Edward Caird, "recognises that to a spiritual being even death itself is but the means to a higher freedom." These views were assailed by Kant, Hegel, and Arthur Schopenhauer (1788-1860), the chief exponent of the opposing theories of pessimism. Schopenhauer's ethics could rise to the thought that in self-sacrifice alone can ever-fresh consolation be found for the ill mankind is liable to: that yielding to desire brings not happiness but new objects of desire. He did not practise self-mortification, and probably arrived at such conclusions empirically as the Preacher who found all things but vanity. Von Hartmann (1842-1906), his most distinguished follower, endeavoured to harmonise science and philosophy. Whether the discussion which arose out of the question "Is life worth living?" can have any value until we experience death, seems to admit of no doubt. To represent suicide as the logical outcome of pessimism for all rational creatures would be inexact, unless we knew as a fact that there was no future life. The doctrine that life is a state of probation wherein our highest business is the formation of character has led to the noblest endeavour and achievement. The indomitable optimism of Shakespeare's "A merry heart goes all the day" and the buoyancy of Browning's "God's in His heaven -- All's right with the world!" are invincible in their encouragement. The consciousness that right is right is often the unflinching mainspring and hope of the humblest, and nowhere finds a more cheery embodiment than in Dickens's "Mark Tapley," who kept jolly in the most depressing conditions. There is a bright side to the gravest problem, as those who have proved the loyalty of friendship in hours of anguish know well. The sun may be seen in the darkest puddle, and even suffering awaken a new and truer bravery.

Opus Operantis and **Opus Operatum**, terms employed by Roman Catholic theologians to describe the effect of religious ceremonies as means of grace to the devout. The first refers to such acts as kissing, or kneeling before, a crucifix in prayer, or the use of the rosary, in which the grace given is dependent on the devotion of the suppliant and not on the material object. The second phrase is used to denote that grace results from the rite itself, as in infant baptism, and presupposes a proper disposition on the part of the recipient, even in the case of the dying who are no longer conscious.

Oracle, the answer of a supernatural being, generally through the medium of a priest or priestess, to some solemn and formal inquiry. The term also used to denote the divinity or hero who gave such answers, and the temple or shrine where such answers were delivered. The divinity was supposed to inspire the human medium, and to the state of mental exaltation thus produced E. B. Tylor gives the name of oracle-possession. The

most celebrated oracles were those of the Greeks, notably that of Phœbus at Delphi and of Zeus at Dodona. The practice of consulting oracles seems to have ceased soon after the beginning of the Christian era, and the early Christians accounted for this by attributing the responses in pagan days to demons, who, they said, became silent when the Christ was born.

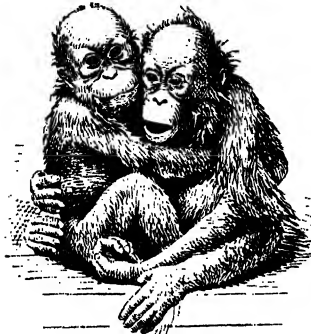
Orakzai (**WURUKZAE**), a people of Afghanistan, Tirah district, north and west of Kohat, and south of the Khyber Pass. They claim to be a section of the Karani Pathans, but are not recognised as true Afghans, nor does the name occur in the national genealogies, though they are now assimilated to the Karani in speech, physique, and many customs. They are grouped in four main divisions—Duolat, Ishmail, Lashkar and Haunsaya—with about sixty subdivisions. The Orakzai are naturally a turbulent people, but were reduced to order by the British expedition of 1891 under Sir William S. A. Lockhart (1841-1900).

Oran, a department of Algeria, North-west Africa, belonging to France. It occupies the most westerly section of the colony, extends from the Mediterranean in the N. to the Sahara in the S., having Algiers on the E., and Morocco on the W., and covers an area of 44,616 square miles. The country is divided into three zones running parallel with the sea, namely the Tell, or coastal region; the High Plateaus, and the Sahara. It is mainly mountainous, and the streams, though numerous, are usually hill torrents, dry in summer, that is, throughout the bulk of the year. The inhabitants are chiefly engaged in agriculture. Wheat and barley are largely grown, and the live-stock consists principally of sheep, cattle, goats, camels, horses and donkeys. The vine, olive, and tobacco-plant are cultivated on an extensive scale. The mineral resources, which include iron, zinc, lead, salt, marble and onyx, have yet to be developed. The manufactures are mostly clothing, paper, oil, tobacco and pottery, besides brewing and distilling. The natives—the majority of whom are Arabs—are skilled in the making of tents, blankets, shawls, and carpets. The largest towns are Oran, the capital, Tlemçen (22,273), Mostaganem (17,485), Mascara (18,405), and Sidi-bel-Abbès (24,265). Pop. of Oran (1901), 1,107,354.

Oran, capital of the department of Oran, Algeria, on the Mediterranean, 260 miles W.S.W. of Algiers. The old Moorish town had attained considerable commercial prosperity, when in 1509 it was captured by the Christians of Spain and made a penal settlement. In 1708 it fell into the hands of the Turks, but was recaptured in 1732 and retained by Spain till the earthquake of 1790, when it was abandoned. It was occupied by the French in 1831. Spaniards still form a large proportion of the European population. The town is defended by two citadels, and has a cathedral, a mosque, a hôtel-de-ville, a prefecture, and a military hospital. The harbour is protected by a breakwater, and ships that used to make the port at Mers-el-Kebir, three miles to the west, now enter Oran. Though the

industries are unimportant, the shipping trade is very considerable, the chief exports being grain, wine and spirit, wool, hides, esparto grass, iron ore and live-stock. Pop. (1901), 87,801.

Orang, the name of the great anthropoid ape (*Simia satyrus*) of Borneo and Sumatra. The name is a shortened form of Orang-utan ("man of the woods"), by which the Malays described not an ape but a forest tribe of low culture. The anthropoid they call Mias; Mias pappan and Mias rambi denoting the dark and the pale race respectively—the former with—and the latter without, fleshy excrescences on the face, and Mias kassir, the smaller variety, described by Sir Richard Owen as *S. morio*. The likelihood is that the ape came by



ORANG-UTANS.

its familiar name through the inability of the earlier travellers in its native haunts fully to appreciate the distinction drawn by the Malays. Some attempt has been made by purist naturalists to introduce the word Mias, but popular usage has so far proved an insuperable

obstacle. The larger form when adult is a little over four feet in height, and is clothed with long, coarse, reddish-brown hair. It is arboreal in habit, living among the topmost branches of trees—in which it constructs its "nest"—and feeding on fruit, leaves, and tender shoots, destroying much more than it eats. In confinement oranges will eat eggs and meat, and it is probable that in the wild state they catch and eat birds, as do the gorilla and the chimpanzee. The stories told of the ferocity of the orang are probably, no doubt unconsciously, exaggerated. Its strength makes it, when enraged, a formidable opponent, but unless attacked it seems not to molest man, and many of the specimens kept in confinement have been very good-tempered.

Orange (from the Sanskrit *nagrunjo*, through the Arabic *naranj* and the Italian *arancia*) is the Provençal name of *Citrus Aurantium* and some allied species, small evergreen trees belonging to the chief genus of the order Aurantiaceæ. The orange is probably a native of southern China and Burma, but grows wild and spinous in Indian jungles. It seems to have been dispersed by the Arabs and Crusaders, and is now grown in all warm regions well supplied with water and free from frost. The scattered glossy leaves are remarkable for their double articulation, having one joint at each end of the winged leaf-stalk. The fragrant white or pinkish flowers have five sepals, five petals, branched (polyadelphous) stamens, and

a changeable number of carpels. These last are united in the characteristic but variable fruit technically known as a hesperidium, which is superior, has a leathery separable epicarp, a woolly mesocarp, and a membranous endocarp. The pulp is an outgrowth from the latter of large spindle-shaped cells filled with watery juice. The seeds often contain more than one embryo. As the fruit takes some months to ripen, it occurs on the tree at the same time as the next year's blossoms. There are two chief varieties or sub-species, the Sweet or China orange, and the Bitter, Bigarade or Seville orange, but the Mandarin and Tangerine oranges are sometimes ranked as a distinct species. Orange wood is used by cabinet-makers. Essence de Petit Grain, a fragrant oil, is distilled from the leaves and shoots; Oil of Neroli and Orange-Flower Water



BRANCH OF ORANGE TREE, WITH FRUIT AND BLOSSOM.

from the flowers; and Essence of Orange-Peel from the unripe fruit. The peel of the bitter orange, which is a valuable stonachic, is mostly obtained from Seville, Malaga, and Tripoli; large quantities are candied in England, and an incredible amount is converted into marmalade every year. They are also brought to Amsterdam from Curaçoa for the manufacture of the liqueur of that name. The supply of sweet oranges comes mainly from St. Michael's, Brazil, Malta, Louisiana, California and Florida. Oranges for export are plucked before they are quite ripe, wrapped in tissue paper, and packed in boxes containing from 250 upwards. The fruit matures while on the dealer's hands. At one time the orangery was a feature of many palaces and mansions, but (though still employed for storing the trees in winter) has become too common to be regarded as a "show" place.

Orange, a town in the department of Vaucluse, France, on the Meyne, 17 miles N. of Avignon. It retains as a monument of its former splendour a fine old triumphal arch and a (restored) theatre, both of the Roman period. The industries include dyeing, tanning, and the making of textiles. During the Middle Ages it was the capital of a small principality, and gave its name to the House of

Nassau, which in 1531 acquired the territory by marriage. On the death of William III. of England without issue (1702), a dispute broke out between the older and the younger branches for the succession, which was settled at the Peace of Utrecht (1713) by means of its sale to France by Frederick I. of Prussia, as representative of the elder line, the title, however, going to the younger line, who became Kings of Holland. Pop. of Orange (1901), 9,705.

Orange, or GARTER, the longest river of South Africa, rises in the Drakensberg mountains, Basutoland, and, following a serpentine course mainly westwards with a slight northerly trend, reaches the Atlantic after a run of 1,000 miles. Its chief tributaries, on the right, are the Caledon and Vaal, and, on the left, the Hartbeest. It drains an enormous area (estimated at 325,000 square miles), but is practically of no use to navigation, owing to the shallowness of its waters in the, often long-lasting, dry season. Its banks are well wooded, especially with mimosa, ebony, and willows, but much of the land bordering it is desert. It serves as the boundary between Cape Colony and Orange River Colony, Griqualand West, Bechuanaland, and Great Namaqualand (German South-West Africa).

Orangemen, a name derived from the title of William III., which was given as early as 1689 to the Irish supporters of the principles of the Revolution. The first Orange lodge was established by the Peep of Day Boys at Loughgall, County Armagh, after the "battle of Diamond," a contest between the Roman Catholic and Protestant population. The primary object was to deprive the Roman Catholics of the arms which they kept contrary to the law. The number of lodges and members greatly increased during the rebellion of 1798, and constituted an effectual safeguard to Protestantism, but the movement was not countenanced by the Lord-Lieutenant. In 1808 lodges were founded in England and, although the organisation was nominally dissolved by the Association Bill in 1825, it continued to be a potent political factor. The election of the Duke of Cumberland as Grand Master in 1835 was followed by a parliamentary inquiry, and the society was temporarily suppressed. It has now spread to other parts of the British Empire, as well as to the United States, but from their invariable choice of districts where Roman Catholicism is strong, Orangemen have often aroused a suspicion that they are less concerned about theology than "spoiling for a fight."

Orange River Colony, a British colony in South Africa, originally the ORANGE FREE STATE, bounded on the N. by the Transvaal Colony, on the E. by Natal and Basutoland, on the S. and S.W. by Cape Colony, and on the W. by Griqualand West. It occupies an area estimated at 50,392 square miles. The Drakensberg mountains flank it on the east and south-east, but otherwise the country is a level plateau from 3,000 to 4,000 feet above the sea, broken here and there by isolated hills or "kopjes." It is watered by the Wilge, Rhenoster, Vet, Modder, and Caledon, besides the Orange on

its southern and the Vaal on its western boundary. There is abundance of good pasture; and, besides horses, goats, and cattle, ostriches are kept. Cereals are grown in the districts bordering on Natal; and there are coal mines in the north and diamond mines in the south-west. Diamonds, wool, ostrich feathers, and cattle are the chief exports. The territory was annexed by Great Britain in 1848, but six years later was handed over to the Boers, by whom it was constituted an independent Republic. It prospered under several able presidents, of whom Sir Johannes Henricus Brand (1823-1888) was the most remarkable; but in 1899, on the outbreak of hostilities between the South African Republic and Great Britain, the Orange Free State, after making sincere efforts to bring about a peaceful settlement, decided to join forces with the Transvaal. After an unexpectedly determined resistance, their territory was invaded by the British, and in March, 1900, Bloemfontein, the capital, was occupied. The country was formally annexed by Great Britain, but fighting continued up to May 31st, 1902, when peace was concluded. In 1907 a new constitution similar to that granted to the Transvaal was created. Pop. (1904), 387,315, of whom 244,636 were coloured.

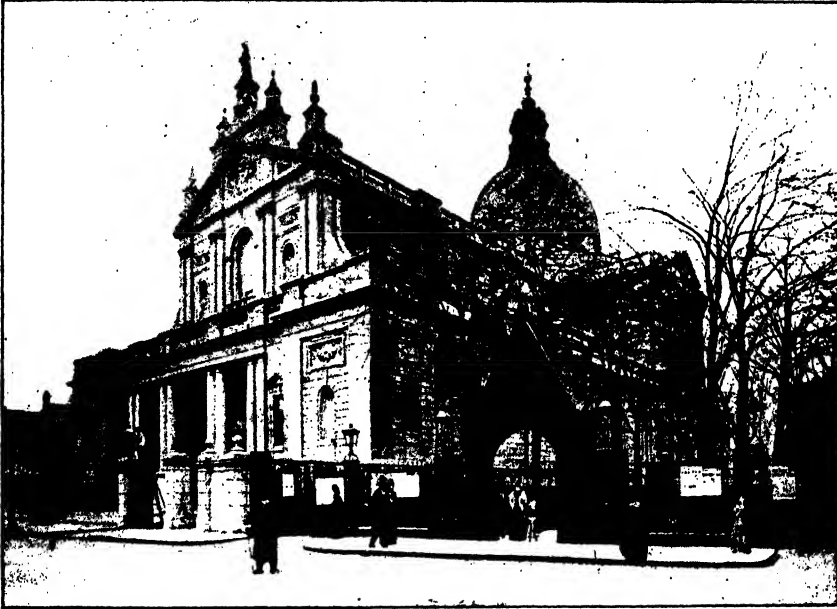
Orange Tip (*Euchla cardamines*, Linn.), a well-known English butterfly which may be recognised by the bright orange spot on the tip of the wing and tessellated ornamentation with greenish-grey or white spots on the under side.

Oratorio, a sacred musical composition, usually dramatic in character, and comprising recitatives, arias, choruses, duets, etc., with full orchestral accompaniment. It is performed without acting or scenic accessories. The name was derived from the oratorio or oratory (place of prayer) of the Chiesa Nuova of St. Philip Neri at Rome, where in the last quarter of the 16th century musical performances took place of which the oratorio was a later development. It was originally designed to convey instruction in the same manner as the mediæval miracle play. It owed its existence to the revolution in musical taste which produced the opera, and at first differed from the latter only in having a sacred, instead of a secular, subject for its theme. The first oratorio, Cavallieri's *Rappresentazione dell' Anima e del Corpo*, performed at Rome in 1600, consisted entirely of recitative, with the usual dramatic accompaniments, among which dancing was included. In spite of the works of Carissimi, Scarlatti, and Stradella, the oratorio was little cultivated by the Italians, to whose bent the opera was far more congenial. In Germany, on the other hand, the mediæval Passion-play, representing the sufferings and death of Christ, developed into the Passion oratorio or Passion music, of which the *St. Matthew* (1729) of J. S. Bach is the most celebrated example. This composition is partly dramatic, but elsewhere epic, in form, and includes a double chorus, certain airs entitled soliloquies, and various chorales, in which the congregation joined. The oratorio was introduced into England by Handel, who finally abandoned the dramatic for the epic form, his two

greatest compositions, *Israel in Egypt* (1739) and the *Messiah* (1741), being entirely in the latter style. The work of Handel was carried on by Haydn, who gave his *Creation* to the world in 1798. Among the most noteworthy oratorios produced in the first half of the 19th century were Beethoven's *Mount of Olives* (1803), Spohr's *Calvary* (1835) and *Fall of Babylon* (1842), and the *Elijah* (1846) of Mendelssohn. The taste for oratorio has been fostered in England by the constantly-recurring musical festivals usually held in one or other of the Cathedrals. Sir Sterndale Bennett's *Woman of Samaria*, Sir Hubert Parry's *Job*, Sir C. Villiers Stanford's *Eden*, Sir Arthur Sullivan's *Golden Legend*,

established the Birmingham Oratory in 1847. In 1849 a congregation was set up in London by Father Faber, which in 1850 became independent and in 1854 was transferred to Brompton, where a fine building has been erected. (2) The Congregation of the Oratory of Our Lord Jesus Christ in France, founded by Cardinal Bérulle in 1613, which received the approval of Paul V. Its main object was the institution of seminaries for training priests. The society was broken up at the Revolution by the civil constitution of the clergy.

Orbit is the path described by any heavenly body with reference to the body which controls it.



BROMPTON ORATORY, LONDON.

and Sir Edward Elgar's *Dream of Gerontius* and *The Apostles* are examples of works of the highest merit by English composers.

Oratory, PRIESTS OF THE. There were formerly two religious orders of this name. (1) The Italian order, founded by St. Philip Neri. The Congregation is composed of secular priests who live together under the same rule, but are not forced to take religious vows. The several communities are mutually independent, each being composed of novices, triennial fathers, decennial fathers, and a superior. The rule, which is merely traditional, enjoins mental prayer in the evening, alternating with the discipline of self-flagellation. The chief ministerial functions of the order are daily preaching and hearing confessions. The order was introduced into England by Cardinal Newman, who

The orbits of all the members of the solar system are ellipses with the sun in one focus, and since we have every reason to believe in the universal application of the law of gravitation, we assume that every other heavenly body travels also in an elliptical orbit. When the ellipse is of enormous length, as in the case of a comet, the part of its path which we are able to investigate is indistinguishable from a parabola. The orbit with which we are most familiar is, of course, that of the earth, and the great circle in which this orbit cuts the celestial sphere is called the ecliptic. The positions of other orbits are usually defined with reference to the ecliptic.

Orcagna, ANDREA DI CIONE, a Florentine artist of the 14th century (born probably in 1316), who excelled chiefly as an architect. He designed

the marble tabernacle in the church of Or San Michele, Florence, and was chief architect of the Orvieto cathedral. Some of his frescoes in the church of Santa Maria Novella, Florence, have been restored, and a panel picture executed for San Pietro Maggiore in the same city is now in the National Gallery, London. Other churches in Florence have altarpieces by him. He died some time between 1368 and 1390, but the date is really uncertain. His elder brother assisted him in his painting.

that even a bleak and exposed spot is preferable to a low-lying valley or plain where the fruit is spoilt by the morning fogs or the late spring frosts. After selecting a suitable spot, the next step is to trench the ground to a depth of about two feet, and in most cases it requires to be drained. The distance between the rows and the trees in each row ought not to be less than 25 feet. The trees intended to be permanent should be perfectly upright standards, with a clear stem of 6 feet from the root to the



NAPOLEON ON BOARD THE "BELLÉROPHON."

[From the painting by W. G. Orchardson, R.A.]

Orchard (Anglo-Saxon *oreard* for *myrt-gæard*, "an enclosure for herbs"), a piece of ground planted with fruit-trees. In England the orchard is a common appendage of the manor-house, vicarage, or farm; but, owing to the ignorance of former generations, it is generally very unproductive. Since the middle of the 19th century, however, fruit has been grown with increasing care and intelligence, and the rules to be observed in forming an orchard are now laid down with scientific precision. The most important matters are the situation and soil. The most suitable soil is a fresh sandy loam, 18 or more inches deep, with a sub-soil of dry gravel or rock. The orchard should, if possible, slope towards the south or south-east, and be sheltered by forest trees from the north and east winds in spring and by shrubberies or high hedges from the south-western winds in autumn. Plenty of light and a free circulation of air are indispensable, whilst damp is highly injurious, so

top, where the branches diverge. In some cases the stocks are first planted and afterwards "worked," i.e. grafted, at the requisite height. The trees should be planted near the surface, banked up with earth, and firmly staked, until they are able to resist the wind. Little pruning is necessary during the first year, and no manure should be applied, except some mulch in cases when the soil becomes dry. The intermediate spaces may be planted with dwarf-trees, bushes, clover, etc.; but the ground should be perfectly clear for a distance of at least 3 feet from each tree. During the whole of the first year constant attention must be paid to such points as the intrusion of grubs and the formation of untimely fruit. In the second year careful pruning is required. Grass or short clover may now be grown between the trees. The apple is the principal orchard fruit in England; but cherries, pears, and plums are freely cultivated in Kent, Herefordshire, and Worcestershire.

There are some fine orchards in Scotland, chiefly in Fife, near Stirling, East and West Lothian, Lanarkshire, Dumfriesshire, and the Border counties.

Orchardson, SIR WILLIAM QUILLER, painter, was born at Edinburgh in 1835. He was educated at the 'Trustees' Academy, then under the direction of Robert Scott Lander, R.S.A., and worked in his native city for several years along with John Pettie, Hugh Cameron, William McTaggart, Peter Graham, and others, who all attained to eminence in their profession. He came to London in 1863 and was a regular exhibitor at the Royal Academy, of which he was elected Associate in 1868, and full member in 1877. Among the best-known of his earlier pictures were "The Challenge" (1865), "Christopher Sly" (1866), and "Queen of the Swords" (1877). His "Napoleon on Board the *Bellerophon*" was acquired for the nation through the Chantrey Bequest in 1881, and since that date his pictures have been amongst the outstanding features of the Academy exhibitions. Of these may be mentioned "Voltaire" (1883), "Mariage de Convenience" (1884), "The Salon of Madame Récamier" (1885), "A Tender Chord" (1886), "Her Mother's Voice" (1888), and "The Young Duke" (1889). As a portrait-painter Orchardson has always been in the very first rank. His work is noted for the distinction of its handling, its perfect drawing, its beautiful colour-scheme, and its telling composition.

Orchestra, in the ancient Greek theatre, was the circular space between the stage and the auditorium set apart for the chorus. It denotes that part of the modern theatre or opera-house which is assigned to the band, and hence is frequently used of the band itself. The orchestra, in the current sense, was first employed, if on a humble scale, in Italy, when Cavallieri (in 1600) and Monteverde (in 1608) arranged that several instruments should accompany the singers or sustain the score in unison. At the same time the harpsichord—the forerunner of the pianoforte—was given a more subordinate place than had hitherto been allotted to it. The potentialities of this innovation were obvious and the great composers—notably J. S. Bach, Handel, and Haydn—all contributed to improve and perfect it. Various instruments were added from time to time—Mozart, for instance, introduced the clarinet and trombone—until in the hands of Berlioz and Wagner the orchestra reached the fullest and richest development of which it is scientifically capable.

Orchidaceæ, the most numerous order of Monocotyledons, including some 5,000 species distributed throughout the world. They are perennial herbs or shrubs, growing terrestrially in temperate climates, generally with tuberculate roots; but in tropical forests becoming epiphytes, clinging with fibrous roots to the branches of trees. These roots have sometimes a spongy absorbent layer or velamen externally, and the stem is often a green pseudo-bulb. The leaves are generally sheathing, and the flowers either solitary or in spike or racemose clusters. They are sometimes

sweet-scented, but in other cases fœtid. Though the beauty and interest of the order depend upon the varied form and colour of the flowers, they are nearly all fundamentally alike in plan. There is a stalk-like inferior ovary, of three carpels, but one-chambered, which is sometimes so twisted as to invert the flower. The three sepals are often petaloid and generally equal; but of the three petals which alternate with them the posterior one is commonly enlarged, sometimes spurred, pouched, or variously modified in form, and is known as the labellum. From its shape British orchids get such names as Man, Bee, Fly, Lizard, or Lady's-slipper Orchis. There are traces of six stamens, and in the last-named genus, *Cypripedium*, two anterior ones of the inner whorl produce pollen; but in other orchids only the one anterior stamen of the outer whorl does so. This stamen is fused with the style into a central column or gynostemium, and its pollen is generally aggregated into pollinia or pollen-masses. The ovules are very rudimentary, and do not appear on the placentas until after the pollen has been conveyed (generally by insect-) to the stigma. The fruit is generally dry and splits into valves. The only important useful product of the order is vanilla, but rare species are bought by connoisseurs for greenhouse cultivation at enormous prices.



ORCHID (*Orchis mascula*).

Orchomēnos, the name of two cities of ancient Greece, one being in Boeotia and the other in Arcadia. The former stood on the northern shore of Lake Copais, and was famous for a musical festival held in honour of the Graces. Its government, an aristocracy, was obnoxious to the Thebans, by whom at the close of the Peloponnesian War the city was destroyed, and the inhabitants were sold as slaves. In 1880 Schliemann discovered a royal mausoleum of great size and splendour. The Arcadian city was situated to the north of Mantinea in a mountainous district in the valleys of which the inhabitants fed their flocks. Outside of the city a wooden image of Diana was set up in a cedar, which was accordingly known as *Artemis Cedreatis*. Early in the Christian era the town fell into complete decay.

Orcin, or ORCINOL, is a compound of the composition $C_2H_6(OH)_2$, which occurs in a large number of varieties of lichens. If allowed to stand in an ammoniacal solution, a reddish-brown powder is deposited which is a constituent of a number of dyestuffs, and is intimately related to the litmus so much employed in the chemical laboratory.

Ordeal (Anglo-Saxon *ordǣl*, *ordél*, "distribution into parts," hence "discrimination" and so "decision"), a method of testing the guilt or innocence

of an accused person which was in use amongst the Anglo-Saxons. It consisted in appealing to the "direct judgment of God" as manifested in the result of some dangerous process to which the accused was subjected. This form of trial was sanctioned by the clergy and took place in the sacred edifice. The commonest kinds were the ordeal of water and that of fire or iron. In either case the accused person prepared himself by means of three days' severe mortification, at the end of which he communicated and took an oath that he was innocent. A special service was then held, and finally the suspect assumed his position between twelve opponents and twelve friends. If the ordeal was by water, he now plunged his arm into boiling water as far as the wrist, and drew out a stone or lump of iron. In the triple ordeal the arm was thrust in to the elbow. The other plan consisted in seizing a bar of iron that had lain on a fire till the last Collect of the service had been read and carrying it for a distance of three feet. Immediately after the trial the arm was bandaged by the priest and so remained for three days. If it had healed at the end of that time the prisoner was pronounced innocent; otherwise he was convicted. There were various other ordeals which were less fully accredited—*e.g.* the accused might be thrown into deep water, in which case a tendency to sink was a proof of innocence; or he might be forced to swallow the corned (consecrated) bread, which always choked the guilty. Some suspected persons—Emma, mother of Edward the Confessor among the number—are said to have refuted their maligners by walking blindfolded and barefoot on red-hot ploughshares. Other ordeals very similar in their general character existed throughout Europe during the earlier part of the Middle Ages. The wager of battle, in which the accused was obliged to fight the accuser, was a form of ordeal only permitted to persons of rank. In the ordeal of the bier, employed in cases of murder, the suspect was required to touch the body. If the corpse then began to bleed afresh the guilt of the accused was demonstrated. The ducking of witches and the formula of "going through fire and water" probably were survivals of the period when ordeals were in vogue. The Anglo-Saxon ordeal survived the Conquest, and is prescribed in the Assize of Northampton (1176), but after that date it rapidly died out, owing mainly to the disfavour of the Church and the growth of the jury system. It was denounced by the Lateran Council of 1215, and finally extinguished in England in 1218 through a letter of Henry III. addressed to the itinerant justices. Methods of trial closely resembling the ordeal existed among the ancient Hebrews and Greeks, and are now practised by various savage tribes; *e.g.* on the Gold Coast inability to swallow "poison-water" is regarded as a proof of incontinence.

Order, a term employed in the classification of animals, plants and minerals to indicate the group immediately below the Class (or Sub-Class) and above the Family. Thus if we regard the Mammals as a Class of the Vertebrates (or backboneed animals), the Carnivora, or Flesh-eaters, will

constitute an Order of the Class, and the Felidæ, or Cats, a Family of this Order. The word has, of course, only an arbitrary value, but its utility, even academically, in the elaboration of a systematic classification, whether in zoology, botany, or mineralogy, is obvious.

Ordericus Vitalis, historian, was born at Ateham, near Shrewsbury, England, on February 16th, 1075. Though his mother was English, and he called himself "Orderic the Englishman," he lived from the age of ten till his death (between 1143 and 1145) in the abbey of St. Evroul in Normandy. Here he wrote his *Historia Ecclesiastica*, a chronicle beginning with the preaching of the Gospel and coming down to 1141. In spite of defects of style and inaccuracies in its chronology, his work is characterised by a sense of justice, a desire to record truth without fear or favour, an eye for character, and an enthusiasm that led him to include rather than exclude materials not directly relevant to his subject. The history has distinct value as an account of the reigns of the first two Norman kings in England, for even when he did not write from firsthand knowledge, he had access to the best available authorities and was discriminating in his use of them. The original MS. is preserved in the Bibliothèque Nationale, Paris.

Orderly, the soldier or non-commissioned officer in attendance on and at the disposal of each commanding officer. A Post Office Orderly fetches the letters; a Court Orderly attends when a court-martial is held; a Hospital Orderly waits upon the sick; and an Orderly Officer is on duty daily in each corps, who inspects the rations, attends parades, visits the guard room, hospital, cells, etc. The Orderly-room is the office where prisoners are interviewed and the lieutenant-colonel and his assistants transact business.

Orders, HOLY. (1) The estate of bishop, or priest, or deacon, conferred by the imposition of hands of lawfully-ordained bishops. (2) The ceremony or rite by which a bishop thus consecrates ministers for the service of the Church. In the Anglican, as in the Roman Catholic and Eastern Churches, this ceremony is regarded as a sacrament. It is held that the power of bestowing grace by the laying on of hands has been transmitted to the bishops through an unbroken series of ordinations from the Apostles. This is known as the doctrine of Apostolical Succession. Hence these orders are entitled holy or apostolical; they are also termed major orders to distinguish them from minor orders, which have not the same spiritual character, although they form part of the ecclesiastical organisation, and are usually conferred by a bishop (but without imposition of hands). Minor orders were instituted for the purpose of relieving the higher officers of the Church of the more secular portion of their duties. Four ranks are included in the minor orders of the Roman Catholic Church—acolyte, exorcist, reader, and doorkeeper. The office of sub-deacon is now usually reckoned among the major orders. The total number of orders is,

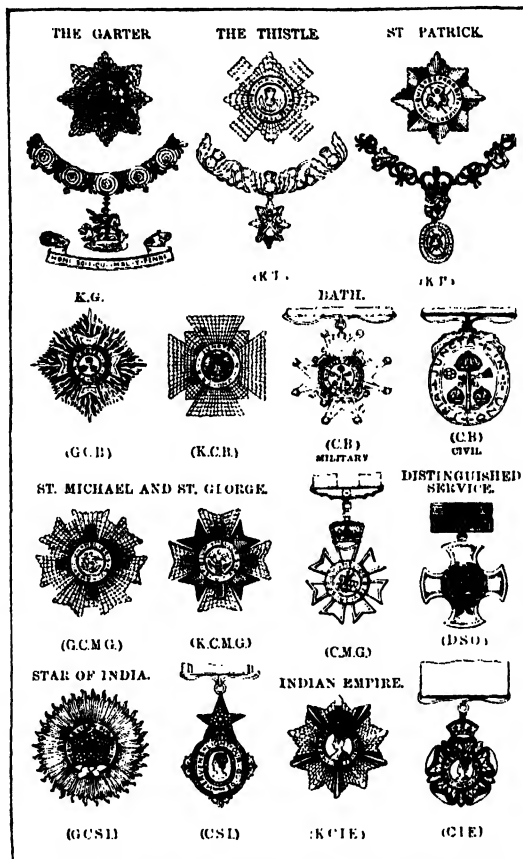
however, only seven, the offices of bishop and priest being regarded as one in respect of their sacerdotal functions. In the Greek Church it is unusual to recognise any minor orders excepting those of sub-deacon and reader (anagnostes) and sometimes that of singer (psalter); by the Reformed Churches they are altogether rejected. In the Anglican Church only the orders of bishop, priest and deacon have been retained.

Orders in Council.

The executive government of the United Kingdom is carried on by ministers of State, the chief of whom form the Cabinet, of which the Lord President of the Council is a member. The Privy Council consists of about 240 members nominated by the King, chosen for life, or for the life of the Sovereign, from both political parties, or for eminent service to the commonwealth. Its duty is to advise the Sovereign on affairs of State, and the Lord President is required to manage the debates, to submit matters from the King, and to report the resolutions taken thereon. But there are no debates in Council, and only on rare occasions does the whole body assemble, as when it is convened to proclaim a new Sovereign. For ordinary business only a small number are summoned, consisting of members of the party in power. In times of emergency or when Parliament is not sitting, the Sovereign issues Orders on the advice of the Council sanctioning legislative acts of urgent necessity which, on re-assembling, Parliament authorises. On certain matters of trade and revenue Parliament has delegated its authority to the Privy Council, which grants Charters of incorporation to public and private bodies, and Royal proclamations are issued by its advice. It has, also, duties of a judicial or quasi-judicial nature, discharged by a Committee of its members, but it is not infallible, and its decisions in matters ecclesiastical (these have a fatal facility for provoking dissension) have not always proved fortunate.

Orders of Knighthood were probably due in the first instance to the growth of the kingly power during the early feudal period. The band of chosen followers (*comites, gesithas, thegnas*) whom the military leader gathered around himself may be regarded as the germ out of which grew the notion of a body of men united by a common ideal of heroic devotion

and martial enterprise. In process of time different rules, badges, and forms of admission as oaths, etc., would naturally become attached to each separate order. Their growth was greatly stimulated by the Crusades, which added religious ardour to military enthusiasm and gave to knighthood an almost sacred character. [CHIVALRY.] It was then that the great orders of the Templars, Hospitaliers, and Teutonic Knights came into existence. Amongst orders of an early date which still survive may be mentioned the Italian order of St. Lazarus (said to have been instituted before 1000); the Bavarian order of St. George (introduced from Palestine in the 12th century); the Spanish orders of Calatrava (1147), St. James of Compostella (1175), and Alcantara; the Portuguese order of St. Benedict of Aviz (1143), and the Swedish order of the Seraphim (1280). In the United Kingdom the Garter was founded in



STARS AND COLLARS OF BRITISH ORDERS OF KNIGHTHOOD.

1349, the Thistle in 1540, the St. Patrick in 1783, the Bath in 1399, the Star of India in 1861, the St. Michael and St. George in 1818, the Indian Empire in 1878, and the Royal Victorian in 1896. A description of various British and other orders is given under separate headings. [BATH, GARTER, GOLDEN FLEECE, ST. GEORGE, ST. PATRICK, THISTLE, STAR OF INDIA, ETC.] In France all orders have been abolished excepting the Legion of Honour, which was instituted in 1802. The Continental orders which now occupy the highest rank include the Austro-Hungarian orders of the Golden Fleece (1429), St. Stephen (1764), established by Maria Theresa as the national order of Hungary, and the

Iron Crown, founded in 1805 and revived by Francis I. in 1816; the Prussian Black Eagle (1701), founded by Frederick I., and Red Eagle (1705); the Italian Annunziata, founded in 1362 and remodelled by Victor Emmanuel II. in 1869; the Danish Elephant (1464), and the Russian St. Andrew (1698). The three highest orders are the Garter, Golden Fleece, and Annunziata, holding the first, second, and third rank respectively. The Chinese order of the Imperial Dragon was established in 1862. Japan has two military orders, the Eastern Sun (1874) and the Chrysanthemum (1876).

Ordnance, guns or other pieces fired from carriages. Such weapons of war are classified into smooth-bore (all muzzle-loaders) and rifled (both muzzle- and breech-loaders). They are made of bronze, cast-iron, wrought-iron, steel, or mixed cast (*i.e.*, wrought-iron and steel) and are either solid or built up, according to the method of construction. An all-steel, built-up breech-loader, with a Krupp or interrupted-screw breech-closing apparatus, would be a type of an up-to-date heavy gun. The great guns in the British navy range from 12-inch 46 tonners to 16:25-inch of 111 tons. Heavy quick-firers include 4-inch to 6-inch guns, while light quick-firers include 3-pounders to 12-pounders. The most effective ammunition is the common shell, filled either with powder or lyddite. The guns in the British army depend upon the uses to which they are put, their weight, velocity, and range varying accordingly. There are 2·5-inch guns for mountain artillery, 12-pounders for Royal Horse Artillery batteries, 30-pounders for heavy Indian field batteries, the 4·7-inch "long Toms," and the 9·2-inch and upwards for coast batteries, besides howitzers and Hotchkiss, Nordenfolt and other machine guns. The smokeless propellant, cordite, is the ammunition, and the projectiles comprise common, lyddite and shrapnel shell, armour-piercing shot and shell, and case shot. The carriages have also been modified and improved to suit the altered conditions as to weapon, ammunition and projectile. For coast artillery hydro-pneumatic disappearing mountings, heavy barbette, and quick-firing mountings have been largely adopted. The carriages of siege howitzers carry elevating gear, and those of field artillery guns are fitted with special brake gear and an attachment to control the recoil.

Ordnance Survey, the name applied to the national survey of the United Kingdom. It had its origin in a trigonometrical survey, inaugurated in April, 1784, by the measurement of a base-line by General William Roy, R.E. (1726-1790), on Hounslow Heath, which was the starting-point of a series of triangles connected with the French triangulation two years later. Soon afterwards, the Government decided on having a general survey for military purposes of the entire kingdom on the scale of one inch to a mile. General Roy's triangulation in the south-east became the basis of the Great Triangulation, which was gradually extended over the whole of the British Isles and finished in 1852. The one-inch detailed survey was carried northwards till, in 1824, it had reached Yorkshire and Lancashire. A large-scale survey of Ireland

having then become necessary for land valuation, the English work was suspended and the staff transferred to the sister country. The Irish six-inch survey proved so useful that, on its completion in 1840, the Government sanctioned the adoption of the same scale for the unsurveyed portions of Great Britain. In 1851 ensued the long controversy termed the "battle of the scales," and for eleven years three Committees and one Royal Commission deliberated and fourteen Blue Books were presented to Parliament. The department was paralysed by the indecision of the Legislature; large numbers of workmen were pensioned off and re-engaged, and great waste of public money took place. Eventually the following measures were decided upon—(1) A topographical map of the United Kingdom on the one-inch to a mile scale; (2) County plans of the same on the six-inch to a mile scale; (3) Parish plans on the scale of 25·344 inches to a mile of most of the cultivated districts in England and Scotland; and (4) Plans on the scale of 126·72 inches to a mile of towns with more than 4,000 inhabitants. London alone with its environs was to be surveyed on the 60-inch to a mile scale. Part of the six-inch survey of Ireland has since been revised on the twenty-five-inch scale at the expense of the Landed Estates Court, the former scale having proved insufficient for the purposes of land sales. It would be difficult to give an idea of the lavish expenditure of public money on indifferent or worthless surveys instituted from time to time to meet pressing demands of the moment. Suffice it to say that in 1842, after the passing of the Tithe Commutation Act in 1856, when the Inclosure Commissioners desired fresh surveys and maps, and in 1845, at the time of the railway mania, many millions were spent and, for the most part, wasted.

The Great Triangulation rests on two principal base-lines and forms bases of verification, measured with Colby's ten-feet compensation bars, which are in themselves a marvel of scientific contrivance and exactitude. By means of this trigonometrical survey the position of about 250 points dotted over the country has been determined with the most refined precision. Among various important scientific undertakings which have emanated from the foregoing may be mentioned the connection of the French, Belgian, and English triangulations, the comparison at Southampton of several national standards, the investigation of the figure and specific gravity of the earth, and the measurement of an arc of the 52nd parallel of latitude from Valentia, in Ireland, to Orsk on the river Ural. In 1870 the Ordnance Survey (originally under the old Board of Ordnance) was transferred to the Office of Works, and in 1890 it was placed under the Board of Agriculture. The Survey staff consists of over 2,500 persons, including officers and four companies of Royal Engineers, and some 2,000 civilian assistants, labourers, and chainmen. The parish and town plans are published at the headquarters at Southampton by zincography, and these are reduced by photography to the six-inch scale for engraving on copper. For the one-inch scale a special drawing is prepared, also for

engraving on copper. Besides its purely routine functions, the Ordnance Survey is called upon to discharge a variety of kindred duties, many beyond the limits of the United Kingdom. It has executed plans of the high-water line and areas of foreshores in the British Isles for the Commissioners of Woods and Forests, maps of the river systems and catchment basins in England and Wales, and a number of miscellaneous surveys and plans for other departments; while in Canada, Gibraltar, and other parts of the world it has plotted large scale surveys for defensive works and other military purposes. The department is also a school for topographers, and parties of surveyors have been trained and equipped at Southampton for the Cape of Good Hope Survey, the Oregon Boundary Commission and the British Columbian expedition; while the Ordnance Surveys of Jerusalem and Sinai, though not paid for from public funds, owed much of their success to their connection with Southampton, which also supplied the working surveyors for the Palestine Exploration Fund. Other European Governments and the United States have made trigonometrical surveys of their countries. The scales vary from the 158 inch to a mile of Norway and Sweden, the 5 inch to a mile of the United States, the 792 inch to a mile of France to the 1267 inch to a mile of the Netherlands, the 2534 inches to a mile of Italy and Switzerland, and the 3168 inches to a mile of Belgium.

Ordovician, or ORDOVIAN, from the Ordovices, an ancient tribe of Central Wales, is a name sometimes applied to a great system of rocks known by Sedgwick as Upper Cambrian and by Murchison as Lower Silurian; but containing a distinct assemblage of fossils. They consist of greywackes, sandstones, grits, flagstones, shales or slates, with limestones in the upper part, and important contemporaneous lavas and tuffs; and they cover a large area in Wales, Shropshire, the Lake district, South Scotland, and the Isle of Man, passing conformably downwards into the Cambrian. Their most characteristic group of fossils is that of the Graptolites; but Trilobites, such as *Asaphus*, *Ogygia*, and *Trinucleus*, Brachiopods, such as *Orthis*, and the Gasteropods *Murchisonia* and *Euomphalus* are abundant. In the limestones corals for the first time become numerous. The system is subdivided as follows:—

Lower Llandovery Series.—1,000 feet. Grits and sandstones.

Bala and Caradoc Series.—6,000 to 12,000 feet. Sandstones, slates, and grits with Bala and Coniston limestones.

Llandeilo Flags.—2,500 feet.

Arenig or Sliper-stone Series.—4,000 feet. Dark slates and sandstones, with Skiddaw slates, 12,000 feet.

Oregon, a Pacific state of the American Union, bounded on the N. by Washington, on the E. by Idaho, on the S. by Nevada and California, and on the W. by the Pacific. The total area is 96,930 square miles. The name was once given to the whole country between the Rocky Mountains and the sea, which was claimed both by Great Britain and the United States. After a period of joint

occupation, the Oregon boundary question caused, in 1845, a misunderstanding between the two countries; but this was put an end to by a treaty, made in the following year, which defined the north-western frontier, though it left some minor questions to be decided by subsequent arbitration. Oregon became a territory in 1848, and was formed into a state in 1857. The surface of Oregon is, on the whole, mountainous, and there were formerly many volcanoes. The chief ranges are the Coast Range, the Cascade Mountains parallel with them, containing several high peaks, such as Mount Jefferson over 10,000 feet, and Mount Hood over 11,225 feet; and the Blue Mountains in the north-east. The principal rivers are the Columbia, which separates Oregon from Washington, and two of its most important affluents, the Snake, or Shoshone (over 900 miles long), which skirts the Idaho frontier, and the Willamette (300 miles long). The Columbia is one of the best fishing rivers in the world, abounding in salmon, trout, and sturgeon. The climate is temperate and moist in the west, but drier farther east, where there are some lakes. The grizzly and black bear and the pronghorn antelope are among the characteristic fauna of the state. Wheat, oats, and barley do well, but the summer is too cool for maize. There are good yields of potatoes and hay, and large quantities of apples, peaches, plums, grapes, and cherries are exported. Oregon is also celebrated for its timber, the conifers predominating, and in the Douglas or Oregon pine providing the best masts in the world. The minerals include gold, silver, copper, iron, and coal. The capital is Salem (4,258), but Portland, on the Willamette, is the largest town (90,426). Pop. of Oregon (1901), 413,536.

Orejones, South American aborigines occupying an extensive territory in the Upper Amazon basin above Loreto, and in the Ica (Putumayo) valley. They pierce the ears for the insertion of large wooden plugs, by which the lobes are extended down to the shoulders, whence their Spanish name, Orejones, meaning "Big Ears." They are in a very poor condition of civilisation, of short stature, and weak constitution, going naked and living in low-pitched huts shaped like the roof of a house, and entered by means of a trap which, while admitting scarcely any light, helps to exclude the flies which swarm in the watery woodlands.

Orel, a south-central government, or province, of Russia in Europe. Its surface is an undulating plateau, nowhere exceeding 900 feet in height, with an area of 18,060 square miles. The chief rivers are the Don, forming the eastern boundary, and its tributary the Sosna, the Oka, a right-hand affluent of the Volga, and the Desna, a left-hand tributary of the Dnieper. The soil, consisting of "black earth" and clay, is very fertile and yields good crops of grain, tobacco, hemp, and potatoes. The raising of live-stock is profitably pursued, Orel carriage and cart horses being in high esteem. The manufactures comprise machinery, locomotives, and other railway plant, chemicals, soap, leather, rope, and tobacco, besides brewing and distilling. Pop. (1897), 2,054,749.

Orel, capital of the preceding government, is situated on the Oka, 208 miles W.S.W. of Moscow. Founded in 1566 it grew very slowly. Its cathedral, begun in 1794, was not completed till 1861. The industries include rope works and flour mills, and the town is an important distributing centre. Pop. (1897), 69,858.

Orelli, JOHANN KASPAR VON, classical scholar, was born at Zurich, Switzerland, on February 13th, 1787. He was a pupil of Pestalozzi and, after filling pastorates at Bergamo and Coire, became professor of eloquence in Zurich Gymnasium (1819). He bore a leading part in the founding of Zurich University, and was appointed, in 1833, Professor of Classical Philology. Besides publishing valuable editions of Cicero, Horace and Tacitus, his other works include *Inscriptionum Latinarum Amplissima Collectio* (1828), *Ciceronis Scholiastæ* (1833), and *Onomasticon Tullianum* (1836-8), and he collaborated with Baier and Winckelmann in producing an edition of Plato. Orelli died at Zurich on January 6th, 1849.

Orenburg, a government, or province, of south-eastern Russia, mostly in Europe, but partly in Asia. It has an area of 73,794 square miles, and is traversed from north to south by the Ural mountains, some of the summits of which exceed 5,000 feet in height. The principal rivers are the Ural, its tributaries the Sakmara and Ilek, the Bielaya, an affluent of the Kama, and the Samara, flowing into the Volga. The minerals include iron, copper, gold, silver, lead, coal, and salt, but are not yet extensively mined. The "black earth" districts furnish crops of wheat and oats, and the flocks and herds are very considerable. The chief industries are distilling, tanning, milling and mining. Pop., largely comprising Bashkirs, Kirghiz, and Cossacks (1897), 1,609,388.

Orenburg, capital of the preceding government, on the right bank of the Ural, 240 miles S.E. of Samara. The manufactures are principally soap and tallow, but the town is of first-rate importance as an emporium of trade, especially with Central Asia, while great quantities of live-stock and dead meat are despatched into the interior of Russia in Europe. The cattle sales are conducted in the Barter House, a building having the appearance of a fortress, and there are large municipal slaughter-houses. Pop. (1897), 72,740.

Ores are minerals containing metals in such a state that they are capable of being extracted by metallurgical processes. The ores consist usually of oxides, sulphide or carbonate of the metal, and occasionally of chloride, phosphate, and other compounds. A quantity of earthy matter, gangue, is always found mixed with the ore, and for the separation of this the ore, before being subjected to the furnace actions, etc., has usually to be exposed to preliminary treatment—ore-dressing. [METALLURGY.]

Orestes, son of Agamemnon, King of Mycenæ, and Clytemnestra, his wife. His father, on his return from Troy, was slain by Clytemnestra and her

paramour, Ægisthus. Orestes was saved by his sister Electra, who conveyed him to Strophius, King of Phocis, with whose son he contracted a deep and abiding friendship. Arrived at manhood, he went to Mycenæ along with Pylades and avenged the murder of his father on Clytemnestra and the usurper Ægisthus. Pursued by the Eumenides, or Furies, he fled to Athens and was purged by the Areopagus; or, according to the story as told by Euripides, he was required by Apollo to go to the Tauric Chersonese (the Crimea) and bring back the statue of Diana (Artemis), which had fallen from Heaven. Pylades accompanied him and the two friends were arrested by the people of Tauris, who sacrificed all strangers to Diana. The priestess of the temple, Iphigeneia, daughter of Agamemnon, interested in the victims as Greeks, offered to spare one if he would carry her letters to her home in Greece. After much discussion between the friends for the privilege of remaining behind to be killed, Pylades at length was induced to depart. The letters were seen to be addressed to Orestes, and this led to the discovery that Iphigeneia was his sister. The three then escaped together, taking with them the statue of Diana. Afterwards Orestes became king of Argos, married Hermione and reached a green old age. Like the friendship between David and Jonathan, that of Orestes and Pylades is the classical type of high-minded, unquestioning, devoted affection between man and man.

Orfella (URFILA), a fierce and powerful people, North Africa, about the shores of the Great Syrtis (the Gulf of Sidra). Tripoli. They speak Arabic, call themselves Arabs, and claim to have migrated from Egypt about the 9th century; but their customs, sub-tribal names, and other indications show a large admixture of the aboriginal Berber element. The Orfellas own all the wells along the caravan routes, and are much dreaded by the surrounding populations: owing to their predatory excursions, the Tirsas oasis, formerly thickly peopled and highly cultivated, has been completely abandoned.

Orfila, MATTHIEU JOSEPH BONAVENTURE, chemist, was born at Mahon, in the Isle of Minorca, on April 24th, 1787. A seafaring life proving unattractive, he studied medicine successively at Valencia, Barcelona, Madrid, and Paris, where he took the degree of M.D. in 1811. The Peninsular War had threatened to ruin his prospects, but Vauquelin befriended him, claimed him as his pupil, and so saved him from expulsion. He soon distinguished himself in chemistry, and having (1818) become a French citizen, was made Professor of Medical Jurisprudence in 1819, exchanging the chair for that of Chemistry in 1823. From 1830 to 1848 he was Dean of the Medical Faculty, in which capacity he was author of several important educational reforms. He died in Paris on March 15th, 1853. He was one of the most brilliant chemists of his time and the founder of modern toxicology. His chief works were *Traité des Poisons* (1813), *Éléments de Chimie Médicale* (1817), *Leçons de Médecine Légal* (1823), and *Traité des Exhumations Juridiques* (1830).

Organ, the most elaborate and grandest form of wind instrument. The structure of the organ is extremely complicated, so that only its main features can be discussed here. The several parts fall naturally, according to their functions, into three divisions: (1) the wind-supply, regulating the admission and distribution of condensed air or "wind"; (2) the pipe-work, consisting of the sets of pipes, in which the musical sound is produced through the intonation of the wind; (3) the action, comprising the apparatus by means of which the player controls the instrument. The wind is admitted through two or more oblique bellows, called feeders, to the horizontal storage-bellows, whence it passes through the wind-trunks into the wind-chests, boxes placed immediately below the pipes. To the upper portion of each wind-chest is fixed an upper-board, a contrivance for carrying the wind through valves to one or more of the pipes. The pipes are attached to the upper-board, several of different quality being arranged one behind the other, so as to communicate with the corresponding digital of the key-board. The transverse rows formed by the pipes are called stops or registers; they have the same quality throughout, and at least one pipe in each stop communicates with each digital. The various kinds of pipes, which may be either of wood or metal, fall into two main divisions: flue-pipes, in which the tone is produced by means of a current of air which rushes through a slit at the lower end of one side and impinges against the sharp edge above it; and reed-pipes, in which the musical note is due to the vibration of a tongue inserted in an aperture in the reed through which the wind passes. The group of stops placed above each wind-chest is called a partial organ. The large organs used in cathedrals commonly comprise four of these partial organs—viz., the great organ, the choir organ, the swell organ, and the pedal organ, to which is sometimes added the solo organ. The action consists of a key-board for each partial organ, a stop-knob for every stop, etc. Key-boards are of two kinds, manuals and pedals, worked by the hands and feet respectively. The compass of the manuals is usually from C C to F in alt (4½ octaves), that of the pedals from C C C to F (2½ octaves). The effect of pressing down a digital on one of the key-boards is to open the corresponding valve between the wind-chest and the pipes. The valve admits the air to a groove running beneath the row of pipes belonging to that key which opens into it through bores at their lower extremities. But at the same time the player may, if he chooses, shut off the wind from the pipe in any set by pushing in one of the stop-knobs which lie conveniently within his reach. These stop-knobs work the cross-slides which pass between the grooves and the pipes above them. It should be added that the key-boards are so arranged as to give a player the control of the whole organ at the same moment.

The water-organs in use amongst the ancient Greeks survived the invention of the bellows, which probably took place about the middle of the 4th Christian century, remaining in use till the

latter part of the 9th century, when bellows-organs began to take their place in churches. The progress in the art of organ-building which took place in the following centuries was due to the care bestowed by the regular clergy on the construction of the small instruments used in monasteries. Up to the middle of the 17th century excellent organs were made by native English craftsmen; but after that date the industry fell into the hands of foreign immigrants.

Orgy, or **Orgies**, a name originally applied to the secret sacrifices connected with the worship of mythological divinities, afterwards more especially to the revels in honour of Bacchus. The rites were performed by women in the winter in hills or places remote from towns. Dress and customs varied in different countries. In some the celebrants, arrayed in fawn-skins, beating cymbals, danced themselves into a state of frenzy. The chief celebrations took place at night, by torch-light, and in some mysteries a bull was torn in pieces, the raw flesh being eaten as an essential part of the ceremony. The rites were not everywhere identical, though in ancient Greece one of the most famous festivals was held every second winter on Mount Parnassus by the women of Attica, who were styled *Maenads* or *Bacchæ*. The festival of Bacchus was accompanied with boisterous songs, dancing and symbolical customs, and when the orgies became public the most shameless license prevailed. Having lost the dignity of mystery, opinion revolted against their continuance. The modern use of these terms is obviously derived from associations of debauchery and drunkenness.

Oriel, or **Oriel-window**. John Aubrey states that "oriele means a little room at the upper end of the hall, where stands a square or round table, perhaps in the old time was an oratory." In Gothic architecture the term meant a recessed window off a large upper chamber, projecting outwards, resting upon a corbel (a piece of stone, wood or iron jutting out from the wall), square or polygonal in plan and divided by mullions. More private and more richly decorated than the rest of the room, it might be used as a separate apartment. They are frequently found at one or each end of the dais to which the lord of the mansion retired after dining with his retainers. In Tudor architecture they are often semi-circular, and hence are more correctly called bow windows. If resting on the foundations of the house they are called bay windows.

Orientation, the adoption of an eastward position in worship or the construction of churches in such a manner that the upper end of the chancel has an eastern direction. The latter practice has been more strictly followed in northern countries than in the south of Europe.

Oriflamme, a little flag of crimson silk cut into three or four vandykes, to represent tongues of fire, on a gilded staff. Originally the banner of the Abbey of St. Denis, near Paris, it was presented by the Abbot to the lord protector of the convent when engaged in the field. In 1082, when Philippe I.

became possessed of the Abbey, the sacred Oriflamme was adopted as the standard of France in place of the blue hood of St. Martin. It is said to have been lost at Agincourt in 1415, but some authorities state it was last used in the reign of Charles VII. In the 15th century it was replaced by a white flag ornamented with fleurs-de-lis. Froissart tells us that no sooner was the Oriflamme unfurled at Rosbeek than the fog cleared off, leaving the French in the light while the enemy remained in misty darkness.

Origen, one of the greatest of the Christian fathers, was born, probably at Alexandria, in 185 or 186. He was educated by his father Leonidas, a Christian who perished (202) under the persecution of Septimius Severus. In 203 he was placed at the head of the celebrated catechetical school of Alexandria, where he resided for nearly thirty years. He earned his living by copying MSS., and spent a highly ascetic life, even carrying out literally the precept suggested by Matthew xix. 12. He learned Hebrew, and made a special study of Plato and the Stoic writings in order to realise the heathen point of view. In these years he also made journeys to Palestine and Arabia, but was recalled by Demetrius, Bishop of Alexandria, who was displeased at a layman having preached. He refused to ordain him, and when this had been done by another bishop about 230 Origen was deposed and banished. He now settled at Cesarea, in Palestine, where he set up a celebrated school, Gregory Thaumaturgus being one of his pupils. Thence he made journeys to Cappadocia, Nicomedia, Arabia, and Athens. During the Decian persecution he was imprisoned and tortured at Tyre, where he died probably in 251. Fragments only exist of the *Hexapla*, a gigantic piece of textual criticism, in which the Hebrew and all existing Greek versions of the Old Testament were placed side by side. His chief apologetic work, an answer to an attack on Christianity by Celsus, an Epicurean philosopher, is extant in the original and is invaluable.

Original Sin, that inclination to evil which exists in humanity recognised both by philosophy and theology. The ninth Article of the English Church defines it as "the fault and corruption of the nature of every man that naturally is engendered of the offspring of Adam; whereby man is very far gone from original righteousness, and is of his own nature inclined to evil, so that the flesh lusteth always contrary to the spirit." The Article was directed against the teaching of Pelagius, who denied inherent sinfulness and the need of God's preventing grace to the beginning of a holy life. He taught that the only evil inherited from Adam was a proneness to follow in the path of disobedience (to which the words "in Adam all have sinned" related), claiming for man unbounded liberty of action. St. Paul thought otherwise, for he wrote, "By one man sin entered into the world, and death by sin; and so death passed upon all men, for that all have sinned." (Romans v. 12.) The term is derived from Augustine, who asserted that Adam's transgression tainted the

entire race and that concupiscence is the distinctive form of sin; that passions lust against the Spirit and, but for the grace of God, would obtain the mastery. Original sin is not imputed but derived by generation, the intimate union of soul and body causing the soul, by reason of the intimacy of the union, to participate in the taint of the body. The ills of life appear to demonstrate the fact of sin, a mystery which helps us to apprehend the still graver difficulty attaching to the doctrine of a moral Governor of the world. Peter Lombard and Thomas Aquinas defined original sin to be concupiscence, and this Methodius explained as an involuntary instinct of the mind, "but it does depend upon ourselves whether or no we are led away by our lusts." Anselm regarded it as the loss of original righteousness meriting condemnation. At the Council of Trent, 1545, it was decided that Adam transmitted the penal consequence of sin, the death of the soul, which could only be remitted by the merit of the death of Christ. The subject is inseparable from the problems of free-will and the origin of evil.

Orinoco, a river of South America, rising in the Sierra Parima, a group of mountains in the south-east of Venezuela, close to the frontier of Brazil. It flows in a north-westerly direction as far as San Fernando de Atabapo, where it is joined by the Guaviare. It then follows a due northward course as far as the centre of Venezuela, when, having been reinforced by the Meta, the Arauca, the Apure, and several other streams, it takes an easterly turn, and enters the Atlantic by many mouths between 8° 20' and 10° N. and 60° 20' and 62° 30' W. The total length of the river is 1,500 miles, of which the lower 900 miles (below the cataract of Atures) and the upper 500 miles (above the cataracts of Maipures) are navigable. The tide reaches as high as Ciudad Bolívar, 240 miles from the sea, and there the river is four miles wide. By the Casiquiare, an affluent which it receives on the left hand, a little above Esmeralda, the Orinoco communicates with the Rio Negro and through it with the Amazon. The Orinoco drains an extent of country whose area amounts to nearly 370,000 square miles, and overflows its banks between June and September.

Oriole, a bird of the Passerine family Oriolidae, with five genera, and especially of the type-genus Oriolus, with twenty-four species, from the warmer regions of the Old World. The plumage is very brilliant, consisting of shades of yellow boldly marked with black. The best known species, *O. galbula*, the Golden Oriole, is about nine inches long; a deep golden yellow is the prevailing colour; there is a blotch of the same hue on the black wings, and the dark tail-feathers are edged with yellow. In summer it is common in central and southern Europe, and ranges eastwards to Irkutsk in Siberia, and its winter quarters are in South Africa. It is an occasional British visitor in spring, and there seem to be a few instances of its breeding in the United Kingdom. It is a shy bird, frequenting groves or the dense foliage of tree tops

In the spring it feeds chiefly on insects, but when fruit is ripe it does considerable damage to the crops, though it probably repays the mischief by the insect pests it consumes. The nest is usually attached to both branches of a horizontal fork, from which it depends. The name Oriole is given in America to the Hang-nests.



ORIOLE.

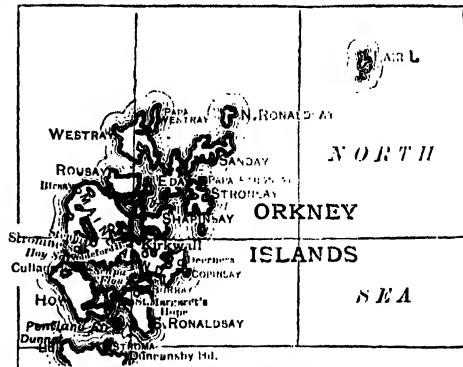
Orion, the subject of several Greek myths, was a mighty hunter, the son of Boeotian parents. Some stories make him the lover of Artemis, by whom he was unwittingly slain through the arts of Apollo. Another myth makes her slay him from jealousy of Eos, who had carried him off to Ortygia; and yet another ascribes his death to the sting of a scorpion. Orion, after his death, was placed among the stars.

Orissa, a province of India, occupying the south-western portion of Bengal, bounded on the N. and N.E. by Chutia Nagpur and Bengal proper, on the E. and S.E. by the Bay of Bengal, on the S. by Madras, and on the W. by the Central Provinces. It consists of British Orissa, embracing the districts of Cuttack, Balasor, and Puri, and covering an area of 9,853 square miles, with a pop. (1901) of 4,350,372, and seventeen Tributary States, situated between the Delta of the Mahanuddy and the Central Provinces, with an area of 14,387 square miles and a pop. (1901) of 1,959,556. The surface of British Orissa is an alluvial plain, that of the Tributary States is hilly. The chief rivers are the Mahanuddy, Brahmani, Baitarani, and Subarnarekha, draining an area of 63,350 square miles. The people subsist almost wholly by husbandry. Rice is the prevailing crop, but pulse, peas, oil-seeds, hemp, tobacco, cotton, sugar-cane, betel-leaf and vegetables are also cultivated. The Tributary States abound with timber-yielding tracts and contain coal, iron and building stone. The only important industry is salt, and gold and filigree work

is carried on in Cuttack. The province owes both its fertility and its calamities to its rivers. But although disastrous floods sometimes occur, periodical famines (as in 1865-6 and 1868-9) decimate the people. In 1568 the last independent King of Orissa was conquered by the Great Mogul, from whom two centuries later the country was wrested by the Marhattas. It was reduced by the British in 1803, when it became part of the East India Company's territory. It now forms a division of commissionership under the jurisdiction of the Lieutenant-Governor of Bengal, and Cuttack is the capital. This country is the seat of the worship of Siva and Vishnu, and at Puri, the religious metropolis of the province, is the famous shrine of Juggernaut.

Orizaba, or CITLALTETZLI ("Star Mountain"), an extinct or dormant volcano in Mexico, 20 miles N.N.W. of the town of Orizaba. It is 18,250 feet high and is the loftiest summit in the republic. The timber line ceases at an elevation of about 13,500 feet. The mountain was last active in 1515-1566, and was first ascended in 1848.

Orkney Islands (the *Orcades* of Ptolemy), an insular county of Scotland, composed of a group of islands in the North Sea, the most southerly being separated from Caithness by the Pentland Firth.



MAP OF THE ORKNEY ISLANDS.

They are 68 in number (of which 29 are inhabited), but the only ones of any size or importance are Mainland or Pomona (207 square miles), Hoy, the most picturesque, Sanday, and Westray. The coast scenery in some cases is wonderfully fine and the colouring glorious. One of the most familiar features is the Old Man of Hoy, a detached sandstone stack 450 feet high. Oats, barley, potatoes, and turnips are the chief crops, the standard of farming being well up to the average Lowland standard, and the crofters' cottages being decidedly superior to those in the Highlands. Agriculture and farming are the predominant industries. The islands contain several examples of the broch, or round tower; at Maeshowe in Pomona is a remarkable example of a chambered tumulus or mound, and at Stennis, four miles to the north-east of Stromness, on the same island, is the largest of the Scottish

stone circles. Sir Walter Scott laid the scenes of *The Pirate* in the Orkneys, and the romance gives a vivid picture of the habits and customs of the Orcadians. At the end of the 9th century the islands were conquered by Harold Fairhair of Norway, and later passed from Norway to Denmark, the king of which gave them in 1468 to James III. of Scotland as security for the dowry of his wife, the Danish Princess Margaret. The Danish kings never redeemed them, but did not finally abandon their claims to ownership till the marriage of Anne of Denmark to James VI. in 1590. The inhabitants are of mixed Scandinavian and Scottish origin. Kirkwall (3,660), the capital, and Stromness (1,750) are the only towns. Orkney combines with Shetland to return one member to Parliament, and Kirkwall belongs to the Wick group of parliamentary burghs. Pop. (1901), 28,698.

Orleans (*Orléans*, the name being a corruption of *Aurelianum*, so called after Aurelianus, who was Roman Emperor from 270 to 275), the chief town of the department of Loiret, France, on the right bank of the Loire, 75 miles S.S.W. of Paris. It was formerly the capital of the province of Orléannais. It was the Celtic Cenabum where, in 52 B.C., the Gauls rose against Julius Cæsar, who laid the place in ruins. It was afterwards besieged by Attila (451), by the Northmen twice in the 9th century, and by the English under the Duke of Bedford in 1428-29, when it was delivered by Joan of Arc, the renowned Maid of Orleans, of whom the town has erected a fine equestrian statue. It was taken by the Germans in 1870 and recaptured by the French, who, however, again lost it after the defeat of the army of the Loire in December. Among its notable buildings are the cathedral, the Musée, which till 1853 was the Town Hall, the library, the Hôtel Dieu, and the Mairie, a 16th-century edifice. A grand forest of oaks and other trees occupies an area of 96,000 acres in the vicinity of the town. Excepting market-gardening (with roses as a speciality) Orleans is not an important industrial centre, although it has manufactures of textiles, artistic ware in metals and other materials, pottery and porcelain and wines, besides iron- and brass-founding. It is, however, a considerable distributing centre. Pop. (1901), 59,568.

Orleans, DUKEDOM OF, an appanage of the French royal family, was first granted to Louis (1372-1407), brother of Charles VI., in 1392. Louis was regent of France during this king's madness and was assassinated by the partisans of Jean "sans Peur," Duke of Burgundy, in 1407. CHARLES, his son (1391-1465), carried on the feud with the house of Burgundy. He was taken prisoner at Agincourt (1415), where he commanded the French army, and lived more than twenty years in England. He was released by the intervention of Philip the Good of Burgundy in 1440, and put an end to the family feud by marrying as his second wife the duke's niece, Mary of Clèves. His first wife had been the widow of Richard II. of England. On the succession of his son Louis (1462-1515) to the throne (Louis XII.), the duchy of Orleans reverted to the Crown. It was revived in the person of Jean

Baptiste Gaston (Gaston d'Orléans 1608-1660), third son of Henri IV., when in 1626 he married Marie de Bourbon. He died in confinement at Blois in 1660. The title having again lapsed, Louis XIV. conferred it on his brother PHILIPPE (1640-1701), husband of Henrietta Anne, sister of Charles II. of England. On his death it passed to his son, PHILIPPE (1674-1723), known in history as the Regent Orleans. His military talents—shown in Flanders, Italy, and Spain—excited the jealousy of Louis XIV., on whose death, however, he became Regent of France. With the help of Dubois, he reversed the traditions of his uncle by allying himself with England and Holland, and expelled the Pretender from France. He died a few months after Louis XV. had been declared of age in 1723, less than 50 years old. His grandson, LOUIS PHILIPPE JOSEPH, called "Égalité," born in 1747, bore the title Duc de Chartres till, on his father's death, in 1785, he became Duc d'Orléans. He became the bitter enemy of Marie Antoinette, especially after the birth of her children, by which his chance of succession to the Crown was removed. He made himself popular with the Paris mob by throwing open the gardens of the Palais Royal and distributing money with a lavish hand. In the Convention he was one of the deputies for Paris, and voted for the death of Louis XVI.; but his short-lived popularity came to an end when his son went over to the Austrians, and he was himself tried and guillotined at the end of the same year (1793). Philippe Égalité was intimate with George IV. when Prince of Wales, and affected things English even more than the Regent Orleans. The Duc de MONTPESSIER, fifth son of Louis-Philippe (b. 1824), also bore the title. In 1846 his father married him to the Infanta of Spain, sister of Queen Isabella. He became a candidate for the throne of Spain after the Revolution, but his chances were ruined when he killed his cousin, the Infante, in a duel in 1870. Afterwards he withdrew to a great extent from public life, although his third daughter, the Princess Maria de las Mercedes, married Alfonso XII. of Spain in 1878. The duke died at San Lucar, near Seville, on February 4th, 1890.

Orloff, GRIGOR GRIGORIEVITCH, the favourite of the Tsarina Catherine II. of Russia, was born on October 17th, 1734. He was the grandson of Ivan Orloff, who won the regard of Peter the Great by his courageous bearing when sentenced to be executed. Gregory planned the assassination of Catherine's husband, Peter III., which was carried out with the help of his brother Alexis in 1762, the latter being probably the actual murderer. Alexis, who survived till 1808, received the title Tchesmenski as a reward for his destruction of the Turkish fleet at Tchesme in 1770. Gregory gained some distinction in the Turkish wars and in alleviating the plague at Moscow in 1771, but was supplanted in the favours of his Imperial mistress by Potemkin. He died at Moscow on April 24th, 1783.

Ormolu, a compound metal in which there is 25 per cent. of zinc and 75 per cent. of copper, treated that it may resemble gold. Employed for

metal mountings for elegant furniture and for other decorative purposes, it became fashionable in France in the reign of Louis XV. and retained its popularity for many years. It has also been used for fine metal-work and even for imitation jewellery.

Ormonde, JAMES BUTLER, 1ST DUKE OF, was born in Clerkenwell, London, on October 19th, 1610. He commanded the English forces in Ireland at the time of the rebellion of 1641, and afterwards tried to hold Ireland for Charles I. He fled to France to escape arrest by the Parliamentarians, but, returning to Ireland, he proclaimed Charles II., immediately on his father's execution. After Cromwell's successes in Ireland, Ormonde joined Charles II. in exile and after the Restoration was created Duke of Ormonde (1661) and served as Lord-Lieutenant of Ireland. As the result of intrigues against him he was dismissed from office in 1669, was elected Chancellor of Oxford University soon afterwards, and, in 1670, his life was attempted by the ruffian Colonel Blood. In 1676 he was a second time Lord-Lieutenant of Ireland and was again recalled in 1685. His health now gave way and he died at Kingston Hall, Dorsetshire, on July 21st, 1688, and was buried in Westminster Abbey. JAMES, 2nd Duke, his grandson, was born in Dublin Castle on April 29th, 1665. He deserted James II. at the Revolution, and, serving in the wars of William III., was made prisoner at Landen (1693). During most of the reign of Anne he was a popular Lord-Lieutenant of Ireland, but left that country in 1712 to take Marlborough's command in Flanders. Soon after the death of Anne he fled to France, the Whigs having determined to impeach him for his conduct of the war. He obtained the dismissal of Bolingbroke by the Pretender, and was to have commanded the fleet which Alberoni had got together for the invasion of England in 1719. After the failure of the Spanish schemes he lived in retirement at Avignon, where he died on November 16th, 1745.

Ormskirk, a town of Lancashire, England, 12 miles N. by E. of Liverpool. The Church of St. Peter and St. Paul, a building of different periods but chiefly Perpendicular, is noted for its chapels. The Derby chapel was the burying-vault of the Stanleys till it was closed in 1851. In the Eccleston chapel is a mural brass of a knight in mail commemorating James Scarsbrick, donor of the great bell (1497) said to have been brought from St. Nicholas's Priory at Burscough. Rope- and twine-making, brewing and iron-founding are the chief industries. Pop. (1901), 6,857.

Ormuz, an island on the northern side of the Persian Gulf, at its entrance not far from the mainland. It is about 13 miles in circumference and 4 miles long. From the sea it presents a picturesque aspect and at one point rises to a height of 700 feet. On the northern shore is the site of the once famous city of the same name which, in the Middle Ages, was an important emporium of trade between Persia and India. The town was captured by Albuquerque in 1507, and remained in Portuguese

hands till 1622, when it was taken by an English fleet and given back to Persia. The town is in ruins, but the fort remains. At the summit of its prosperity it is said to have had a population of 40,000, but now the inhabitants of the island are estimated at 400.

Ormuzd (*Ahramazda*, "the wise lord"), the Supreme Deity of the Persians and modern Parsees. In the system of Zoroaster Ormuzd represented the principle of Good as opposed to Ahriman, the principle of Evil.

Orne, a department of the north-west of France, bounded on the N. by Calvados, on the N.E. by Eure, on the S.E. by Eure-et-Loir, on the S. by Sarthe and Mayenne, and on the W. by Manche. It has an area of 2,372 square miles. A range of hills running from east to west across the south separates the streams that flow into the English Channel—the Tongues, Dives and Orne—from those that fall into the Seine—the Eure, with its tributary the Iton, and the Bille. The chief minerals are iron, copper, black lead and granite. Agriculture flourishes, the principal crops being wheat, oats, barley, and potatoes. Apples and pears are extensively cultivated for cider and perry. It is famous for its horses and cattle. Sheep and poultry are raised for the Paris market. The industries include linens, cottons, lace, pins, needles and ironware. Alençon (14,886) is the capital. Pop. (1901), 325,445.

Ornithology, the branch of zoology which treats of birds. Bird-fanciers, especially in Scotland, have appropriated the term as a designation for shows of poultry, canaries, and other birds, the exhibitions being actually reported in provincial papers under the heading "Ornithology."

Ornithoptera, a genus of swallow-tailed butterflies (*Papilionidae*) which inhabits India and Malaysia, and is remarkable for the great size of the individuals belonging to it. The expanse of wing varies from about 3 to 9 inches. The males are usually of a fine velvety black colour.

Ornithorhynchus (*O. anatinus*), the "water mole" of the settlers, called also the Duck-billed Platypus, or Duck-bill. It is a lowly aquatic mammal from Tasmania and Australia, the sole species of its genus, which constitutes one of the two families that make up the Monotremes. The adult male is about 20 inches long and the female somewhat less. The strange duck-like bill is formed by the horny sheath which covers the expansion of the premaxillary bones and the mandible. In 1888 Mr. Poulton found teeth in an embryo, and in 1889 Mr. Oldfield Thomas found functional teeth in some young skulls. When worn away by friction these teeth are not replaced by a second set, but horny structures are developed, those in front being sharp-edged, while those at the back of the mouth function as molars. The thick soft fur is glossy brown in colour. Each limb bears five digits, armed with strong claws, and on the fore limbs the membrane between the digits projects

beyond the claws, making these limbs admirable swimming organs. The membrane is turned back on the palm when the animal is walking or burrowing. There is a perforated spur on the hind foot in the young, which disappears in the female. It communicates with a gland, and seems to be a poison organ, but there is only one recorded instance of its use, which is probably limited to certain seasons. The burrows are made in river banks, and have two entrances, one above and one below the water-level. These animals feed on insects, molluscs and worms, which they take under water and stow away in their cheek pouches, rising from time to time to masticate and swallow their prey. Their sense of smell appears to be fairly acute. The aborigines always asserted that these



ORNITHORHYNCHUS.

animals laid eggs, and their story was believed by many Europeans, but no proof of its truth was obtained till 1884, when Mr. W. H. Caldwell's discoveries put the matter beyond doubt, and made it clear that two eggs are laid at a time, each about $\frac{3}{4}$ inch long, with a "soft" shell, probably broken by the bill of the young.

Ornithosauria, a name proposed by Professor H. G. Seeley for the Pterosauria, the group of fossil reptiles that includes the Pterodactyl, to indicate his belief in their close relationship to birds.

Oroks (OROKOS), a people of the island of Sakhalin, off the east coast of Manchuria. They occupy the northern and central districts, contin-

gent southwards on the Ainu, who are the true aborigines of the island. The Oroks are a branch of the Tungus with pronounced Mongolian features and a language closely related to that of the Olchas (Oltas) of the mainland, whence they appear to have emigrated at an unknown date. They dwell in sugar-loaf huts, and live by fishing and hunting, pursuing the reindeer, which they have learnt to tame, using it both as a mount and pack animal. After the occupation of Sakhalin by the Russians the Oroks were greatly reduced in number, and are estimated now at not more than 500.

Oronchon (OROCHON), i.e., "Reindeer Keepers," a general tribal name occurring in many parts of Siberia. The best known are a Tungus people of the Amur basin, reaching from the Daurian frontier for sixty miles eastwards to the Amur, where it is joined on its left bank by the Oldo.

Orontes, now known as NAHR-EL-ASL, a river in the north of Syria. It rises near Baulbek and enters the Mediterranean after an unnavigable course of 240 miles, first in a northerly and then a westerly direction. The banks are in some places 300 feet high, and are clothed abundantly with figs, vines, sycamores, and myrtles. Antioch is situated on its left bank, twenty miles from its mouth.

Orosius, PAULUS, a native of Tarragona, Spain, wrote, in the fifth century, a compilation which he called *Historiarum adversum Paganos Libri VII*. It is a record of the calamities that afflicted mankind from the Fall to the period of the Goths (A.D. 417) and, though of little value, was a popular textbook in the Middle Ages and was translated by King Alfred. Orosius was a disciple of St. Augustine (about 411) and wrote against Origen.

Orotchi (KEKAR), a people of the Maritime Province, East Siberia, Asia. They are scattered in small groups over the whole region from the coast to the Sikhota-Alin range, and about the head-waters of the Ussuri. Although a branch of the Tungus family, they have become largely mixed with the Chinese in the southern districts, where they are called Man-tze and Ta-tze. They have flat, square features, high cheek-bones, thick lips, olive-brown skin, slant eyes, long lank black hair, and their language is closely related to that of the Goldi, a Tungus people of the Amur basin.

Orpheus, the hero of many Greek myths, was said to have received the gift of the lyre from Apollo, who, according to one tradition, was his father. With his music he charmed both animate and inanimate nature. By its power he saved the Argonauts from all perils in their voyage, and "drew iron tears down Pluto's cheeks," inducing the god to permit him to take away his wife, Eurydice, from Hades. Having, however—in violation of the condition on which she had been allowed to accompany him to the upper world—looked upon her as they ascended, Orpheus again lost her. He himself met with a violent death, being, according to one legend, torn in pieces by

Mænads for refusing to worship Dionysus, or, according to another, smitten down by the thunder-bolt of Zeus for revealing the divine mysteries.

Orrery, or **PLANETARIUM**, a working model of the system of heavenly bodies. Various spheres, made to scale, represent the planets, and these are geared up in such a way as to move around a model sun in the same directions and in the same orbits as do actual planets. Their velocities, too, are the same fraction of the actual velocities, so that their motions with respect to each other are the same as the movements viewed in the celestial sphere. The mechanism is usually operated by clockwork. Though only a scientific toy, an orrery can be made to convey some general notion of the movements of the planets of the solar system. The Earl of Orrery, in 1715, paid for the construction of the first model—designed by George Graham (1675-1751), the clockmaker and mechanician—which was accordingly named after him.

Orris Root (apparently a corruption of "iris root"), the rhizome of *Iris germanica*, *I. pallida*, and *I. florentina*, which has an odour of violets, and has long been used for tooth-powder, hair-powder, and liqueurs. It is imported from Leghorn, Trieste, and Mogador, that from the first-named port being most esteemed.

Orsini, **FELICE**, revolutionary, was born at Meldola, in the Romagna, Italy, in December, 1819. In 1838 he followed the study of law at the University of Bologna, where Mazzini's party of Young Italy enlisted his active sympathies. He and his father took part in the rising of 1843, and Felice was condemned to the galleys for life, but was pardoned later. In 1848 he fought in the service of the Venetian Republic and, when disturbances broke out in Rome, became a member of the Roman Assembly. On the collapse of the Republic he retired to Genoa and Nice and, as an ardent Mazzinist, was constantly in the political movements of the period. At Mantua in 1855 he was condemned to death, but escaped in 1856 to London, where he published (1857) *Austrian Dungeons in Italy and Memoirs and Adventures*. By this time he had broken with Mazzini and had come to the conclusion that the removal of Napoleon III. would help the cause of liberty both in France and Italy. Accordingly on the 14th of January, 1858, he and his fellow-conspirators Rudio, Gomez and Pieri hurled bombs at the carriage of the Emperor and Empress as it approached the Opera-house in Paris. Ten persons were killed and a great many injured, but Napoleon and the Empress escaped without harm. Gomez was sentenced to penal servitude for life, the three others to the guillotine. Rudio's punishment was afterwards commuted, but Orsini and Pieri were executed, on March 13th, at the Place de la Roquette. Orsini's last words before the fall of the knife were, "Vive l'Italie! Vive la France!"

Orthez, a town of the department of the Basses-Pyrénées, France, on the right bank of the Gave de Pau, 24 miles N.W. of Pau. The industries include tanning and skin-dressing, paper-making,

brass-founding, dyeing, nail-making, besides marble-quarrying and the preserving of Bayonne hams and other special articles of food. Of the ancient castle of the viscounts of Béarn, who flourished in the Middle Ages, the singular pentagonal keep (the Tower of Moucade) is the chief relic. The stream is spanned by a 14th-century bridge of three triangular arches of unequal size. In the centre rises a tower the base of which is pierced with a vaulted passage and lighted with a window called the Priests' Window, from which, an unfounded tradition says, Gabriel Montgomery, in 1569, compelled the priests and monks of the town to throw themselves into the river. This was at the period of the Reformation, when the people of Orthez were strongly Protestant. Theodore Beza was a teacher in the Calvinistic University established by Jeanne d'Albret. Attempts forcibly to convert the inhabitants to Roman Catholicism were afterwards made periodically, but with little success. Wellington defeated Soult near Orthez on February 27th, 1814. Pop. (1901), 6,035.

Orthidæ, a family of Brachiopoda, members of which are common in the Palæozoic rocks. Orthus, the type-genus, ranges from the Lower Silurian to the Carboniferous, as does also the second important genus, Strophomena.

Orthoceras, a genus of Nautiloiden, which includes long, straight-chambered shells that are often of great length. The genus ranges from the Upper Cambrian beds to the Trias of the Alps. It is, however, mainly characteristic of the lower part of the Palæozoic group. It is the type of the family Orthoceratiidæ. Some large species in China are cut open and polished and then used as religious symbols; they have been described by travellers as "Pagoda shells."

Orthoclase (POTASH-FELSPAR), typically consisting of 61·6 per cent. of silica, 18·5 per cent. of alumina, and 16·9 per cent. of potash, and crystallising in the Oblique system. It occurs in large crystals in porphyritic rocks, such as the granite of Shap Fell, and is usually opaque, white, cream-colour, or pink. Its hardness is 6, and its specific gravity 2·5; it is scarcely affected by acids, and is only fusible at the edges with the blowpipe. It occurs often associated with quartz and horn blende, as an essential constituent of granite, syenite, felsite and gneiss, and readily undergoes kaolinisation or hydration into China clay.

Orthodoxy, sound doctrine, the standard in Christian countries being the teaching of the undivided Holy Catholic Church. When two persons study Scripture with no other guide than their own judgment and arrive at opposing conclusions, a standard of interpretation is obviously necessary to decide which is correct. In early days, as heresies developed, the need for fuller definitions of the faith was made apparent; hence creeds and liturgies were elaborated and a body of literature grew up, whose authors by common consent were acknowledged as the Fathers of the Church. The meaning of the term Orthodox became defined, and it can only

be accurately applied to those who hold the historic creeds as taught by the first six General Councils. The term is often used loosely, and in a popular sense is held to represent the opinions of the advocate, its antithesis, heterodoxy, of course constituting the views of his opponent.

Orthoptera, an order of insects in which the front wings are leathery, and hence are known as *tegmina*. The pupa is active, so that the metamorphosis is of the type known as incomplete. The order includes the cockroaches, crickets, locusts, grasshoppers, etc. Most of the members inhabit the tropics. There are some sixty species in England.

Ortolan (*Emberiza hortulana*), the Green-headed Bunting, of the family Fringillidae. It is a native of Europe and Western Asia, migrating southwards in autumn, though its winter quarters are not accurately made out, and returning about the end of April or the beginning of May, and then ranging as far north as the Arctic Circle. Its length is a little over six inches, and its plumage greenish-grey. In habits and general appearance the ortolan resembles the yellow-hammer, but has less brilliant plumage. These birds feed on insects, especially beetles, and seeds. They are highly esteemed for the table, and in their northward and southward flights large numbers are netted and fattened in dark rooms for the market.

Orvieto, a town of the province of Perugia, Italy, on a height near the confluence of the Paglia and Chivaria, 60 miles N.W. of Rome. The cathedral (founded in 1290) in black and white marble is one of the most beautiful examples of Gothic in Italy, the western façade containing much remarkable sculptures. One of the curiosities of the town is the Well of St. Patrick, now disused. It was 180 feet deep to the water-line and 46 feet in diameter with a double winding inclined plane of a gradient gentle enough to allow oxen to ascend and descend for water. The district is noted for its wine. The name Orvieto is said to be a corruption of *Urbis vetus*, the name of the place in the 7th century. Owing to its inaccessible situation it was commonly resorted to by the popes as a city of refuge in the troubles of the Middle Ages, no fewer

than thirty-two pontiffs having sought its friendly shelter. Pop. (1901), 18,543.



ORYX: A, FRONT VIEW OF HEAD.

Oryx, a genus of antelopes with four species: the Leucoryx (*O. leucoryx*), ranging from Gambia to Abyssinia; the Gemsbok (*O. gazella*), from South Africa; the Beisa (*O. beisa*), from

Eastern Africa; and the Beatrix antelope (*O. beatrix*), from Arabia. They are large, heavy-built animals, with long horns. The Beisa is said to be the Unicorn of the ancients, the creature's horns, when seen in profile, appearing as one.

Osage Orange (*Machera aurantiaca*), a tree of the order Moraceae. It is a native of North America, has a varying height of from 20 to 60 feet, and shiny ovate leaves, and its fruit resembles green warty oranges. The wood is strong, flexible, and susceptible of high polish.

Osages, North American aborigines, a distinct branch of the Siouan (Dakota) family. They formerly roamed over a considerable part of Arkansas and the north-west parts of Indian Territory. They have been grouped in three main divisions: Big Osage (highlanders), Little Osage (lowlanders), and Arkansas Band (upland forest people). They number about 1,800 and are mostly found in the Osage Agency, Oklahoma.

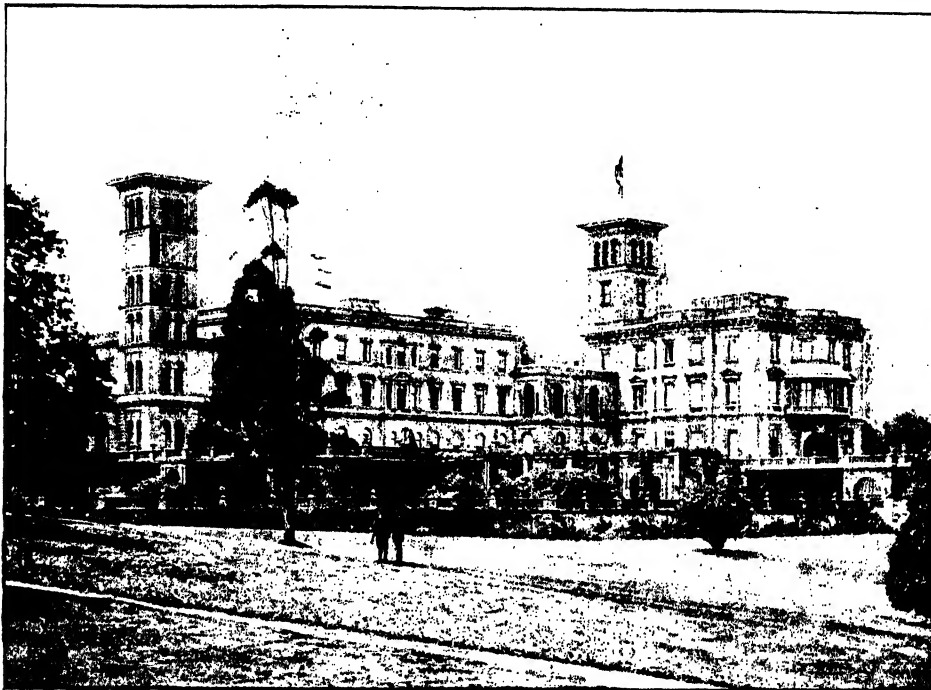
Osaka, a treaty-port of the island of Hondo, Japan, at the mouth of the Yodo, 28 miles S.W. of Kyoto. It is intersected by canals to such an extent that it has been called the "Venice of Japan," while owing to its arsenal, and numerous factories, machine shops and cotton and woollen mills it has similarly been described as the "Manchester of Japan." Other manufactures include matches, boots and shoes, and glass. Theatres, temples and pagodas are common features of the town. Although the harbour does not admit of large ships, Osaka takes precedence as the first commercial city of the Empire. Pop. (1901), 821,235.

Osborn, SHERARD, Arctic explorer, was born at Madras on April 25th, 1822. He entered the navy in 1837, and in 1838 commanded the gun-boat *Hyacinth*, taking part in the operations against China (1840-2). He interested himself in the search for Sir John Franklin, and commanded a ship in the expedition, and also made a notable sledge journey to the west of Prince Edward Island. From 1852-54 he commanded the Arctic ship *Pioneer*, and was in 1855 employed in the Sea of Azov till the close of the Crimean War. He afterwards was engaged in China and, in 1858, ascended the Yang-tse-kiang for 600 miles. He saw further service in the Gulf of Mexico in 1861-2. In 1865 he became agent to the Great Indian Peninsula Railway, and in 1867 managing director of the Submarine Telegraph between England and the East and Australia. He was made Rear-Admiral in 1873, and to the end of his life he interested himself in Arctic research. He died in London on May 6th, 1875. He was an author of repute, his works including *Quedah, or Stray Leaves from a Journal in Malayan Waters*; *Stray Leaves from an Arctic Journal*; *The Discovery of a North-West Passage by Captain McClure*; and the *Last Voyage and Fate of Sir John Franklin*.

Osborne, DOROTHY, daughter of Sir Peter Osborne, was born in 1627 at Chicksands, Bedfordshire. In 1648 William, eldest son of Sir John Temple (a member of the Long Parliament), left Cambridge without taking a degree and started to

travel abroad. On his way he met Dorothy and her brother in the Isle of Wight. At the inn where they lodged young Osborne amused himself by writing with a diamond on the window-pane his opinion of the ruling powers, "And Haman was hanged on the gallows they had prepared for Mordecai." This led to their arrest and, when brought before the Governor, Dorothy, trusting to the gallantry of the Roundhead, took the offence upon herself and the party was set at liberty. She was twenty-one, a year older than Temple, who, impressed by her courage, ready wit and hand-

lover. Once she writes, having been provoked by one of her brothers, "We talked ourselves weary; he renounced me and I defied him." Though with feminine vanity she reminded Temple "how great she might have been if she had been so wise as to have taken hold of the offer of H.C.," she never regretted her choice. Temple remained constant when small-pox cruelly robbed her of her beauty and eventually they were united before a justice of the peace in the parish of St. Giles's, London, on January 31st, 1654-5. They lived in Ireland and to "please his wife" Temple wrote indifferent



OSBORNE HOUSE, ISLE OF WIGHT.

[Photo: A. Debenham, Curcs.]

some looks, fell in love with her. But many obstacles intruded. Her father held Guernsey for King Charles and, even when the war was over and he had returned to Chicksands, the young people's prospects hardly improved. Dorothy had many suitors, among whom was Henry Cromwell, fourth son of the Lord-General afterwards Protector, whose attentions she thought flattering. Mr. Hutchinson describes him as a "debauched, ungodly cavalier." Dorothy loved dogs and he gave her a fine Irish greyhound. Love, however, triumphed over ambition and the opposition of her family. Temple waited and travelled and their courtship continued during seven years in which she wrote the letters which won Lord Macaulay's praise and have made her name famous. It must have been a sore trial to defend her absent

verse. In 1663 they settled in England at Sheen, Temple's widowed sister, Lady Giffard, joining them. We lose sight of Dorothy Osborne in her husband's diplomatic wanderings. When he retired from politics he bought an estate near Farnham, in Surrey, which he named Moor Park and to which Swift, whose mother was a connection of Lady Temple's, came as secretary. Besides several children who died in infancy, the Temple's had a daughter, Diana, who died aged fourteen in 1679, and a son, John, to whom his parents were devoted and who, in 1689, became Secretary of State for War. Anxiety and the treachery of an agent preyed on John Temple's mind and he drowned himself beneath London Bridge. Lady Temple died at Moor Park and was buried in Westminster Abbey on February 7th, 1695.

Osborne House. In 1844 Queen Victoria purchased the estate of Osborne in the Isle of Wight from Lady Isabella Blachford. It then consisted of about 800 acres, which later purchases increased to 2,000 acres. The house proving inconvenient a new one was built in the Italian style by Cubitt, in the designs for which Prince Albert took an active part. The foundation stone was laid on June 23rd, 1845, and the building was completed in 1851. In the grounds a Swiss Cottage was erected as a playhouse and workshop for the royal children. It was always a favourite residence with the Queen and it was here that she died on January 22nd, 1901. In July, 1902, King Edward VII. presented it to the nation, reserving the apartments occupied by his mother, and, as suggested by him, it is now used as a Convalescent Home for Officers of the Navy and Army.

Oscanz, one of the chief branches of the Italic division of the Aryan family. They were regarded as the aborigines of central Italy south of Latium by the Greeks, who called them Opici, from *ops*, "land" (whence *Opici*, *Osci*). They were Romanised soon after the Samnite Wars, but their language, a sister to Latin, presenting some marked phonetic peculiarities, long survived in the hilly districts. Of this language the most interesting record is the Agnone bronze, found (1848) in a ruined temple and written on both sides from right to left in an old Italic alphabet like the Etruscan; its date is unknown, but it is conjectured to belong to about 150 B.C.

Oseola ("Black drink," so given to signify his hardihood, as evidenced by his quaffing such a mixture), Indian warrior, was born on the Chattahoochee river, Georgia, United States, in 1801.



OSEOLA.

His father was an Englishman named William Powell, his mother being Indian. When quite young he went with his mother to Florida, where he attained to great influence among the Seminoles. In 1835 his wife—he had married the daughter of a fugitive slave—was seized as a slave. His threats of revenge gained punishment for him at the hands of Colonel Thompson, the United States agent at Fort King, and six months later he killed the colonel and others. He then put himself at the head of a band of his men, destroyed a military force that was sent against him, and held his own for two

years, being then seized while under the protection of a flag of truce (1837). He was imprisoned in Fort Moultrie, South Carolina, where he died on January 30th, 1838.

Oscillatoria, a group of blue-green algae. They inhabit fresh or salt waters, dampgrounds, or hot springs, and consist of multicellular filaments in a mucilaginous sheathing often felted together in a senn. They derive their name from a complex system of spontaneous movements, the filament bending, rotating on its axis, and creeping backwards and forwards.

Oscott, a Roman Catholic college near Birmingham, which, under Cardinal Wiseman, its president, became a centre for the English Roman Catholics. At the close of the 17th century it was the seat of a mission and in 1752 was made a college for clergy and laity, being named St. Mary's College. In 1835 the present buildings were erected, and in 1889, lay students being no longer admitted, it became an ecclesiastical seminary. After the creation of a diocesan hierarchy in England in 1850 by Pius IX., Wiseman held the first Provincial Synod of Westminster at Oscott in July, 1852, when John Henry Newman preached a famous sermon on the "Second Spring."

O'Shaughnessy, ARTHUR WILLIAM EDGAR, was born in London on March 14th, 1844. Through the influence of the first Lord Lytton, in June, 1861, he obtained a junior appointment in the library of the British Museum and in 1863 he became an assistant in the Natural History Department. He perseveringly applied himself to the study of ichthyology and ultimately was recognised as an authority, but his tastes inclined to literature and poetry. In 1870 he surprised the readers of verse by publishing his *Epic of Women and other Poems*, which attracted much attention by its lyrical beauty and dramatic power. *Lays of France*, which appeared in 1872, and *Music and Moonlight* (1874), while revealing gifts of melody and imagination, did not sustain the promise of his first volume. In 1873 he married Eleanor, daughter of Dr. Westland Marston, with whom he wrote *Tayland* (1875), a book of children's tales. His wife died in January, 1879, and he mourned her loss in a touching elegy. He died January 30th, 1881, from the effects of a chill, and in the same year a posthumous volume, *Songs of a Worker*, was issued. It contained some fine poems on sculpture, but did not enhance his reputation. A genuine poet, he did not develop in intellectual power, though, he has been praised by F. T. Palgrave for his gifts and "a haunting music all his own." O'Shaughnessy was a warm admirer of French literature and an accomplished writer of that language.

Oshkosh, capital of Winnebago county, Wisconsin, United States, on both banks of the Fox river where it enters Lake Winnebago, 49 miles S.S.W. of Green Bay. There is a good harbour, and a considerable export trade in lumber and flour. The town has shingle-planing and saw-mills, furniture factories, breweries, tanneries, foundries, and machine-shops. Among the chief buildings

are a court-house, several churches, schools, etc. It is a favourite summer resort and angling centre. Pop. (1900), 28,284.

Osiander, ANDREAS, a Lutheran clergyman, was born at Gunzenhausen, Bavaria, on December 19th, 1498, and was educated at Leipzig, Altenburg and Ingolstadt. In 1520 he became a priest and was appointed Hebrew tutor in the Augustinian convent at Nuremberg and, two years later, preacher of St. Lorenz Kirche in the same city. Throwing in his lot with the Lutherans, he took part in theological controversy against the Swiss Reformer, Zwinglius. He was present at the Conference of Marburg in 1529, and at the Diet of Augsburg in 1530, and was made professor of theology in the university of Königsberg by Duke Albert of Prussia. In 1549 he engaged in a dispute with Martin Chemnitz and others as to Justification, and afterwards opposed Melancthon. The controversy ended in the defeat of his party after his death on October 17th, 1552. His son, LUKAS OSIANDER (1534-1604), was a theologian of some repute in his day and published an edition of the Latin Bible with a commentary, besides original works on *Institutio Christianæ Religionis* (1576) and an Epitome of the *Magdeburg Centuries*, a Church history compiled under Protestant auspices.

Osier, a species of willow (*Salix viminalis*), the tough, flexible boughs of which are extensively employed in basket-making and wicker-work generally. It specially affects damp alluvial tracts in Great Britain, Holland, Belgium, and France. The word *Osier* is applied to articles made of osiers, and to the place where osiers are grown. In order to promote a luxuriant crop of branches it is customary to cut back the willow almost to the trunk. Trees thus treated are called pollarded. Beds of osiers are known in some parts of England as *osier-belts*.

Osiris, the greatest of Egyptian gods, the embodiment of Good, as his brother, Set, was that of Evil. Some considered him as the son, others as the husband and brother, of Isis and father of Horus. He is said to have conquered Egypt and to have founded a good system of laws, but to have fallen at last through the machinations of Set. He is also represented as judge of the dead, and his figure is accompanied by many symbols. The myth is usually interpreted by supposing that Osiris is the Sun, and Set Night or Darkness.

Ossler, WILLIAM, professor of medicine, was born on July 12th, 1849, at Bondhead, Ontario, Canada. Educated at Trinity School and Trinity University, Toronto, McGill University, Montreal, and University College, London, he proceeded to Berlin and Vienna, where he specially studied physiology and pathology. In 1874 he was appointed Professor of the Institutes of Medicine in McGill University and, eleven years later, became Professor of Clinical Medicine in Pennsylvania University, Philadelphia, and, in 1889, Professor of Medicine in Johns Hopkins University, Baltimore. In 1904 he was appointed Regius Professor of Medicine in the University of Oxford. His principal works are

Cerebral Palsies of Children (1889), *Chorea and Choreiform Affections* (1894), *The Principles and Practice of Medicine*, *Lectures on Abdominal Tumours* (1895), *Angina Pectoris and Allied States* (1897), *Cancer of the Stomach* (1900), *Science and Immortality* (1904), and *Æquanimity and Other Addresses* (1904).

Osmanli, a branch of the Uzbeqs, who passed in the 11th century from the Turkoman Desert to the Iranian tableland, and thence to Asia Minor and the Balkan Peninsula. They take the name of Osmanli from Osman (Othman) I., El Ghazi, "The Victorious" (1259-1326), originally a petty chief of Bithynia, who overran a great part of the Byzantine Empire and founded the present Turkish dynasty. The Osmanli Turks, a brave, hardy race, mainstay of the Turkish Empire, form the bulk of the rural population of Asia Minor, where they have long abandoned the nomad life of their ancestors, and are now chiefly occupied in tillage and stock-breeding. The language is pure Türkî in structure, closely allied to the Chagatai of Turkestan, but much mixed with Arabic and Persian words and even phrases, especially as spoken and written by the upper classes, who use the Arabic character, though ill adapted to express the sounds of the Turkish language.

Osmium (symbol, Os; atomic weight, 190.3), a rare metal which in its properties is closely allied to platinum, belonging to the platinum group of metals. Its chief source is the ore known as osmiridium, consisting chiefly of a compound with iridium. This ore is so hard and unalterable that it is employed for bearings where the most extreme hardness is desirable. It is for the same reason employed for the tips of stylographic pens. It occurs chiefly in California, the Urals, and at Katherinenberg. Its specific gravity is the highest of all known substances, being 22.43. Its salts have not been much studied and are only of chemical interest; but one of its oxides, osmic acid, is used in dilute solution for hardening animal tissues for microscopic preparations. At 100° C. it gives off a very offensive odour, hence the name (Greek, *osmē*, "smell").

Osmose may be best explained by describing a simple experiment. Let a small cylinder of glass, or some other suitable material, be closed at one end by a diaphragm of some porous substance—either an animal membrane or unglazed earthenware; fill this cylinder with a liquid—say alcohol—and plunge the whole in a vessel of water. The small cylinder is closed with a cork through which passes a glass tube. After the cylinder has been immersed in the water for a short time, the alcohol will be seen to rise in the tube, and during the course of a day the rise may be a foot or more. [ENDOSMOSE.] This passage of the water through the diaphragm into the alcohol is known as *osmose*, and differs from diffusion in that *osmose* takes place in one direction only, while in the case of diffusion between two liquids a constant exchange, and therefore movement in two directions, is going on. According to Thomas Graham (1805-1869),

who devoted much time to the study of this phenomenon, osmose is really due to chemical action between the liquids and the porous septum. The rise of sap in trees and the passage of liquids in the bodies of living creatures are probably due to osmose, and not to capillarity, as has been often assumed.

Osmunda, a genus of ferns of which the large British species, *O. regalis*, the Royal or so-called Flowering Fern, is the type. The fronds, sometimes six feet or more in height, are leathery, and the "fructifications," or sporangia, are confined to the terminal pinnae, which develop no green leafy tissue. The sporangia originate from cells other than those of the epidermis, and have the annulus represented by a group of thick-walled cells on one side of their apices. *O. regalis* grows in huge tufts in marshy spots.

Osnabrück, a town of Hanover, Prussia, on the Hase, 70 miles W.S.W. of Hanover. There is an old part—with narrow and irregular streets—and a new part, which is well built, and the suburbs contain some good houses. Among the chief buildings are the Roman Catholic cathedral and the church of St. John, and the Protestant churches of St. Mary and St. John with a 12th-century tower. Among the industries are iron- and steel-founding, machine- and railway-shops, bleaching, paper-, flax-, and cotton-mills, tile-making, and brewing, and the manufacture of tobacco and a coarse cloth, which became known in the United Kingdom as Osnaburg. The town is an important emporium for trade, Westphalian hams being a prominent article, and has large cattle and horse fairs. The bishopric was founded by Charlemagne about 790, but the burghers held an independent attitude towards the bishops and joined the Hanseatic League. The town was at the top of its prosperity in the 15th century, but declined through dissensions at the Reformation and suffered also in the Thirty Years' War. The Peace of Westphalia was signed, on October 24th, 1648, in the Town Hall, which contains portraits of the plenipotentiaries. In terms of this treaty the bishopric was to be filled alternately by a Catholic and Protestant, this system surviving till 1803, when the bishopric was absorbed in Hanover, Frederick, Duke of York, being the last incumbent. It was revived as a Roman Catholic see, without territorial jurisdiction, in 1858. Pop. (1900), 51,574.

Osprey, FISH HAWK, or SEA EAGLE (*Pandion haliaetus*), the sole species of the type-genus of the Raptorial family Pandionidae, almost universally distributed. There is another genus (*Poliaetus*) with two species, ranging from India to the Sandwich Islands. The osprey is an occasional British visitor and still breeds in Scotland. The adult male is a little less than two feet long; the plumage on the under-surface is yellowish-white, as it is on the head, where it is marked with brown, the colour of the rest of the upper surface. These birds feed principally on fish. The milliner's and feather-dealer's "osprey" is a term commonly but ignorantly employed for the plumes of the egret or

heron, and has nothing whatever to do with the sea eagle. It has been surmised that this erroneous trade use of the word originated in a confusion of "spray" and "osprey."

Ossa, the classical name of a mountain on the seaboard of Thessaly, Greece, the modern KISSAVOS. It is situated on the eastern side of the Peneus (the present Salamoria, the most important of Thessalian streams), is 6,408 feet high, and is separated by the famous Vale of Tempe from Mount Olympus. According to Greek fable, the Giants, in their wars with the Gods, attempted to scale the heavens by piling Ossa upon Pelion (the modern Plessidi, 5,308 feet), an adjoining mountain. Ossa was also the residence of the Centaurs.

Osseti, a people of Caucasia, where they occupy both slopes of the central range between Lezghistan and Imeritia, east and west, and from Kabardia southwards nearly to Tiflis. They comprise three main divisions, Iron, Digor, and Tualt, speaking three distinct dialects of a rude Aryan language, showing decided structural affinities to the old Iranian (Persian). Under each division is a large number of tribes of very mixed origin, as shown by the great diversity of types (Iranian, Georgian, Kabard, Mongol, and even Semitic), with a total population estimated at from 150,000 to 200,000. The Iron, *i.e.* Iran, are probably of Iranian descent, while the others have been traced to the Aryan Alans, some of whom settled in North Caucasia at a remote epoch. These appear to be the Assy (Assy) of the Russian chronicles, whence the general name, Ass, Oss, Osseti, applied to the whole people by the Georgians. During the historic period the Osseti have been twice Christians and twice Mohammedans, and at present about twenty per cent. are Moslem, the rest nominal Christians, still practising many old superstitious rites. Field operations are left to the women, while the men ply various crafts, such as saddlery, tanning, forging, besides hunting and, till lately, brigandage. The vendetta is still observed in its full vigour, despite the efforts of the Russian authorities to suppress a custom which leads, now as formerly, to constant bloodshed.

Ossett, a town of the West Riding, Yorkshire, England, 3 miles W.N.W. of Wakefield. The leading industries are connected with the woollen and mungo trades and the neighbouring coal-mines.



OSPREY.

The chief buildings are the Church of the Holy Trinity (in the Early Decorated but wholly modern), the Technical School, and the Public Library. It has saline springs and baths. Pop. (1901), 12,886.

Ossian, a heroic poet of the Gaelic tribes. He is said to have been the son of Fionn, who lived in the 3rd Christian century, and his works consist chiefly of accounts of the doings of Fionn and his family. Ossian himself is said to have been carried off when young to fairyland, and on his return in old age and blindness, to have recounted the legends to St. Patrick. Originally fragmentary, the Ossianic poems have become a generic term for ancient Gaelic literature, whether of Scottish or Irish origin. They possess little interest now, but in the 18th century excited a warm controversy, when (in 1760 and the following years) James Macpherson (1736-1796) published the two epics *Fingal* and *Temora*, and shorter poems, which professed to be translations of Ossian. The genuineness of his work was called in question in his own life-time by Dr. Johnson, with unnecessary bitterness and dogmatism. Macpherson, there is no doubt, was not a Gaelic scholar, and the conclusion generally accepted is that he composed original poems founded on certain legends of the Gael and passed them off as translations of works that had never had independent existence save as traditions. Macpherson's version of Ossian had extraordinary influence on the literature of his own and other countries, and was a work of real genius. The controversy on the subject was conducted for several years in an acrid and most injudicial spirit, but Sir Walter Scott, in *The Antiquary*, bestowed some good-humoured satire upon the question.

Ossification is the term applied to the process by which, in the course of development, true bone is deposited and takes the place of the more rudimentary structures which represent this tissue in the embryo or growing child. Ossification is of two kinds: in the first place, there is what is called ossification in membrane, such as occurs, for example, in the flat bones of the skull, which are developed from membranous structures; in the second place, there is ossification in cartilage, such as occurs in the case of the long bones, the representatives of which in the embryonic condition are rods of cartilage. The changes which the cartilaginous rod undergoes in the process of conversion into bone are somewhat complicated. They begin at definite points, which are termed centres of ossification. Here the cartilage becomes permeated by minute blood-vessels, and its substance is impregnated with lime-salts, *i.e.*, calcified. The calcified cartilage is later reabsorbed, and a framework of spongy bone laid down in the ossifying tissue. This spongy bone becomes in its turn absorbed and replaced by compact bone. The centres of ossification are the points at which the most active changes are manifested. Such centres are usually found near the ends of long bones, and the increase of these bones in length is consequent upon the continued advance in the process of ossification at such centres. The bone increases in

thickness by the formation of new bone beneath the fibrous investing layer of the bone called the periosteum.

Ossington, JOHN EVELYN DENISON, LORD, Speaker of the House of Commons, was born at Ossington, Nottinghamshire, on January 27th, 1800, and educated at Eton and Christ Church, Oxford. He first entered Parliament in 1823, as one of the members for Newcastle-under-Lyme, and among other constituencies which he represented were Hastings (1826), Liverpool and Nottingham County (1831, a double return: he selected the latter seat), South Nottinghamshire (1833, 1835), Malton (1841, 1847, 1852), and North Nottinghamshire (1857, 1859, 1866, 1868). On the resignation of Charles Shaw Lefevre (afterwards Viscount Eversley) Denison was unanimously chosen Speaker, being afterwards thrice re-elected to the chair. On his retirement after nearly fifteen years' service in consequence of failing health, he was created Viscount Ossington (1872). He did not enjoy his honours long, however, for he died at Ossington on March 7th, 1873. In politics he was a moderate Whig, but his career was undistinguished. He was cultured, impartial, and dignified, and though pre-eminently "safe," his authority was apt to be lacking in firmness. It was at his suggestion that the Speaker's Commentary on the Bible was undertaken. In the Speakership he was succeeded by Henry Brand (afterwards Viscount Hampden).

Ossyebos, a people of West Equatorial Africa, who occupy the left bank of the Ogoway, where they are continuous with the Adumas. The Ossyebos are a fine race of modified Negro type, speaking a Fanti language, related to the Mpongwe of the Gaboon district. They are not to be confounded with the Osyebas, who form a main division of the Fans.

Ostade, ADRIAN, painter, was born at Haarlem, Holland, in December, 1610, and received his art training under Frans Hals. He achieved the highest honours of his craft, among them the presidency of the Painters' Guild, in Haarlem, where he died on April 27th, 1685. He was most at home in the rendering of such subjects as tavern-scenes, village fairs and country-life generally, and takes rank with the greatest masters of *genre*. His brother, ISAAC OSTADE, was born at Haarlem in May, 1621, and remained under his tuition until 1641. His pictures of "The Five Senses" and "Laughing Poor," besides many more, show that, had his life been spared, he would have accomplished work of really fine quality. He died at Haarlem, aged 28, on October 16th, 1649.

Ostend, a town of West Flanders, Belgium, on the North Sea, 70 miles W.N.W. of Brussels. It is one of the most fashionable and most bracing summer resorts on the Continent, the Sunday parades on the front in August being regarded as one of the most brilliant spectacles in Europe. The Digue, or sea-wall, three miles long, 40 feet high, and 105 feet wide, affords a fine promenade. The principal buildings are the Royal villa, the Hôtel

de-ville, and the Kursaal. Ostend is the chief fishing station of the kingdom, the herring and cod fisheries being the most important, and there is also a noted park for lobsters and oysters, which are conveyed from English beds to be fattened here. To accommodate the growing commerce there are several docks and harbours with extensive quayage. There is a great traffic in rabbits and dairy produce. The most glorious incident in its history is its three years' resistance of the Spaniards (July 5th, 1601, to September 14th, 1604). The fortifications constructed in 1545 by the Prince of Orange have given place to boulevards. Captured by the French in 1794, it was handed over to the Netherlands in 1814 and since 1830 has belonged to Belgium. Pop. (1900), 39,484.

Ostia, a town of Latium, in ancient Italy, at the mouth of the Tiber, 14 miles S.W. of Rome, of which it was the port. It was founded in 627 B.C. by Ancus Martius, who also established salt-works here. Originally a trading port, it became in the Punic Wars a naval station, and its inhabitants were exempt from military service. Owing to the silting up of the lower Tiber, the Emperor Claudius about A.D. 50 caused a new harbour—which received the name of *Portus*—to be constructed and connected it with Rome by a canal. This soon rivalled Ostia, which gradually decayed and was finally destroyed by the Saracens in the 9th century. Both places are now in ruins.

Ostracism, a form of banishment introduced into Athens by Cleisthenes. Its object was to prevent any citizen who was conspicuous through his ability, riches, or popularity from acquiring too great power in the state. When the people had decided that ostracism was necessary, a public meeting (*eclesia*) was held in the market-place (*agora*), and the citizens voted by tribes, each depositing at a fixed spot a piece of earthenware or an oyster-shell (*ostrakon*) on which was written the name of the person whose banishment he desired. The citizen who obtained the largest number of these unfavourable votes was forced to leave Athens for ten years. The most illustrious victim of this system of *plébiscite* was Aristides, called the Just, whom his fellow-citizens banished in 483 B.C., although the sentence of exile was revoked within four years. A similar institution called *petalism* existed in Syracuse in which an olive-leaf (hence the name, from *petalon*, Greek, "a leaf") was substituted for the earthenware. This custom lapsed in 452 B.C.

Ostracoda, an order of Crustacea, belonging to the sub-class Entomostraca. The members of the order are all small, but a few deep-sea marine species are nearly an inch in length. The body is not divided into segments; the abdomen is rudimentary, and there are seven pairs of appendages, but these are not adapted for swimming. The body is protected by a bivalve shell. The members are all aquatic and occur either in the sea or fresh water; they swarm in great numbers, and their dead shells often render fresh-water clays easily fissile. The order is widely distributed, and

fossil species are known from the Cambrian onwards. Cypris is one of the commonest genera; it is fresh-water. Cythere is one of the commonest marine forms. There are seven families.

Ostreidae, the family of Mollusca, of the class Lamellibranchiata, of which the common oyster (*Ostrea edulis*, Linn.) is the type. The two other principal members are the genera *Anomia* and *Placuna*. The family ranges from the Carboniferous period onwards. Is typically marine, but some specimens live in only slightly brackish water.

Ostrich, a bird of the Ratite genus *Struthio*, with two species, from Africa and Arabia. The head, neck, and thighs are naked; the tarsi are covered with scales; they have only two toes; and the quill-feathers of the wings and tail—the ostrich plumes of commerce—have their barbs quite free. Ostriches are the largest living birds, standing from six to eight feet high. The rudimentary wings are useless for flight, but these birds run with great speed, and then their wings are spread out and act as sails, helping them along. There is not a great deal of difference between the two species. *S. camelus*, the common form, has the widest range, and in these birds the naked skin is red, while in *S. molybdophanes*, from Somaliland, it is bluish, and there is a red plaque in front of the tarsus. Ostriches are principally



OSTRICH.

vegetable feeders, and wild birds do considerable damage to grain crops. Extraordinary stories have been told of the powers of digestion of these birds, probably arising from the fact that when at liberty they swallow stones to aid the gizzard in its work, and in confinement gulp down readily for the same purpose whatever may be offered. The large eggs are well-known objects in museums and in private collections. In bulk they are equal to twenty-four hens' eggs, and are excellent eating. Authorities differ as to the quality of the flesh of these birds. That of the young is generally allowed to be very good, while that of the old birds is said to require the sharp sauce of hunger to render it palatable. Ostriches are polygamous, each male living in company with several females, which deposit their eggs in a common nest—if a hole in the sand can be so called. The male takes part in incubation, generally sitting at night. These birds have been known from remote antiquity. They are mentioned in the Hebrew Scriptures and in the classics. It was formerly the custom to hunt the ostrich on horseback for its plumes, and the natives of South Africa stalk it, clothing themselves in ostrich skins, so as to get near the birds without exciting alarm, and shooting them with poisoned arrows; but since 1867 the market for ostrich plumes has been almost entirely supplied with those taken from domesticated birds. The wing plumes are more highly prized than those of the tail, and the yield from the male bird is much more valuable than that of his mate. Ostrich-farming became an established industry at the Cape of Good Hope about 1867. In the earlier years handsome profits were realised and large fortunes rapidly made. But when supplies overtook the demand and other sources were opened prices fell to a much lower level, although the industry has since steadied itself. Mrs. Annie Martin's *Home Life on an Ostrich Farm* (1890) gives a lively and convincing account of the habits of the birds under restraint and of the trials that farmers must undergo. The French have established ostrich-farms in the north of Africa, and birds have been introduced into Australia and America for the same purpose.

Ostyaks. (1) Ostyaks of the Obi, a historical people of West Siberia, who before the Russian invasion (1501) were very powerful, possessing numerous fortified towns and a well-developed national organisation. They are now reduced to a number of small groups scattered over a space of about 400,000 square miles, chiefly in the Obi basin, but numbering altogether scarcely more than 26,000. They call themselves Manzi, "men," Ostyak being a Tatar word (Ushtiak) meaning "strangers," unless it be a corruption of As-yak, "people of the As," i.e., the Obi river. The Ostyaks form one of the three main divisions of the Ugrian Finns, their language, of which there are three marked dialects (Irkutsk, Surgut, and Obdorsk), being most nearly related to that of the Voguls of the Ural Mountains. (2) Ostyaks of the Yenisei, Siberian aborigines of the Upper Yenisei basin as far as the confluence of the lower

Tunguska, usually classed as Samoyedes; but the language, of which there are several varieties (Assan, Arinzi, Kotti, etc.), appears to be quite distinct. It is highly agglutinating and has been compared with the Basque of the western Pyrenees, with which, however, it has no structural resemblance.

Oswald, St., King of the Northumbrians, was born about 605. He was the son of Æthelfrith, and was thus on his father's side of the line of Ida of Bernicia, while on that of his mother, Aeca, he was of the royal house of Deira. At his father's death in battle in 617, he took refuge among the Scots of Iona, who are said to have converted him. In 633 he returned to Northumbria, and two years later made himself master of Deira and Bernicia by a victory which he heralded by constructing a cross on the battlefield. He Christianised his people, and was killed in battle at Oswestry, in 642, becoming afterwards one of the most popular saints in the north of England. His day is August 5th.

Oswaldtwistle, a town of Lancashire, England, 3 miles E.S.E. of Blackburn. The manufactures include cotton, prints, pottery, and chemicals, besides collieries, quarries, and bleach-works. Sir Robert Peel, the first baronet and father of the Free Trade statesman, was born at Peel-fold in 1750. Pop. (1901), 14,192.

Oswego. [MAIZE.]

Oswego, capital of Oswego county, New York, United States, on both banks of the Oswego, which here falls into Lake Ontario, 35 miles N.N.W. of Syracuse. The chief buildings are the City Hall, Court-house, Arsenal, and Government Building. It possesses a State Normal and Training School. There is a great transit trade from New York and Canada to the west, and the plentiful water-power is utilised for saw- and flour-mills. Iron-founding, ship-building, machine-making, and tanning are carried on, besides manufactures of starch, textiles, hosiery, matches, and oils. The place was visited, in 1615, by Champlain and, later, by other explorers. In 1722 it became an English trading-port, Governor Burnet (son of the bishop-historian) erecting a fort five years afterwards. This was captured by Montcalm in 1756, but the English rebuilt fresh works in 1759 and held the position till 1796, when it was handed over to the United States. Pop. (1900), 22,199.

Oswestry, a town of Shropshire, England, 18 miles N.W. of Shrewsbury. Of the ancient wall and castle a few fragments remain, the grounds being laid out as a public space, and the principal buildings are St. Oswald's Church, the Municipal Buildings, standing on the site of the old Town Hall, the Corn Exchange, Cross Market, the Public Hall, Victoria Rooms, and the Grammar School, endowed in the reign of Henry IV. by David Holbeche. The industries include malting, tanning, currying, fellmongering, wool-stapling, and iron- and brass-founding, besides saw-mills and the making of machinery and agricultural implements. The cheese, butter, and cattle fairs are important and

the town is a busy distributing centre. Oswestry was named after Oswald, King of Northumbria, who was slain here in 642 by Penda, King of Mercia. Britons, Saxons, Normans and Welsh in turns fought for the town, which was burned by John in 1212, and by Llewellyn twenty-one years later. The municipal archives testify to an unbroken corporate existence of more than six centuries. Pop. (1901), 9,579.

Otago, a province occupying the southernmost portion of South Island, New Zealand, bounded on the E., W., and S. by the Pacific, and on the N. by the provinces of Westland and Canterbury. It covers an area of 25,187 square miles, and has a coastline of 400 miles. The chief harbours are Otago, Bluff, and Invercargill. The western part and the centre are mountainous, the heights ranging from 3,000 to 9,000 feet, and the upland pastures are excellent for sheep. The principal rivers are the Clutha, the longest in New Zealand, draining lakes Hawea, Wanaka, and Wakatipu; the Taieri, entering the sea to the south-west of Dunedin; the Mataura, Oreti, Jacobs, Waiau, and others, falling into Foveaux Strait, which divides South Island from Stewart Island. The east and south are fertile, and produce much wheat, besides flax and timber. Gold and coal are the important minerals. The capital, Dunedin (pop. 21,879, or with suburbs 52,390), is at the head of Otago harbour. The colony, of Scottish origin, was founded in 1848. Pop. (1901), 173,115.

Otalgia, pain in the ear, or ear-ache. It may be due to some disease affecting the external passage of the ear, or to inflammation of the middle or internal ear. In some instances it seems to be associated with caries of a tooth. In all ear affections it is safest to consult a doctor, since serious mischief to the more delicate structures may follow any attempt to treat disease without expert advice.

Othman, founder of the Ottoman Empire, was born in Bithynia in 1259. In 1299 he possessed himself of part of Bithynia, and subsequently of a great part of Asia Minor. From him the Turks take their name of Osmanli.

Otho, MARCUS SALVIUS, Roman Emperor, was born on April 28th, 32. He was a friend of Nero and a companion of his debauchery. He is said to have obtained the preconship of Lusitania, which he held for some time, in exchange for his wife, Poppæa Sabina, whom he introduced to Nero's notice. In 67 he declared for Galba against Nero, and helped to murder Galba in 69, becoming himself emperor. He did not reign long, however, since the army in Germany sided with Vitellius, and after some reverses finally defeated the forces of Otho, who thereupon committed suicide after a rule of three months.

Otho I., THE GREAT, Holy Roman Emperor, was born in 912 and, on the death of his father, Henry I., in 936, was elected King of Germany and crowned at Aix-la-Chapelle. His life was largely taken up with wars, the first of these being a war of fourteen years against Boleslas of Bohemia,

whom he compelled to embrace Christianity. He then defeated the Dukes of Bavaria and Franconia, and repulsed the Danes. In 951 he aided the Italians against the usurper Berengar II., whose queen (Adelaide) he married, and was crowned King of Lombardy. He was next beset by family revolts, which he repressed, and, after overcoming the Hungarians, reappeared in Italy, of which he was crowned king in 961, being crowned Roman Emperor by the Pope in 962. His later years were employed in worsting the Greek Emperor, who had refused to acknowledge his title. He died at Memleben, in Prussian Saxony, on May 7th, 973, and was buried in Magdeburg.

Otis, JAMES, statesman, was born at West Barnstable, Massachusetts, United States, on February 5th, 1724. In 1743 he graduated at Harvard, and applied himself to the law. He entered keenly into the questions that arose between the Colonies and the mother country and, in a dispute about the Navigation Laws, threw up his appointment as law officer of the Crown, and pleaded the cause of the Colonists before the High Court with such force and eloquence that he became a man of mark and was chosen to represent Boston in the Colonial Assembly. He wrote many papers to the Colonists and, on their behalf, to the home Government, and acquired the position of recognised leader of the revolutionary party. In 1769 he was attacked in a coffee-house, and received such injuries to his head as brought on insanity. He was struck dead by lightning at Andover, Massachusetts, on May 23rd, 1783.

Otitis, inflammation of the middle ear, is accompanied by pain and increased redness of the membrana tympani. It may be due to catching cold; the severer forms resulting in the formation of pus in the cavity of the middle ear, with perforation of the drum of the ear, and discharge of matter externally, usually occur in children after an attack of measles, scarlet fever, or other disease. A simple catarrh may yield to warm fomentations and mild purgation; but ear-ache involves so many possible serious complications that it is advisable to procure medical advice from the onset. The discharge of pus from the ear (otorrhœa) is apt, if neglected, to persist for a long time, and in some cases has resulted in septic mischief or cerebral abscess.

Otley, a town of Yorkshire, England, 10 miles N. by E. of Bradford, on the right bank of the Wharfe. The Norman church of All Saints contains a carved monument, dated 1640, to Edward Fairfax, who translated Tasso, and died near Otley in 1635. Other structures include the Court-house, the Mechanics' Institute, in the Italian style, and the Victoria Jubilee Clock Tower and Fountain (1887). The Prince Henry Grammar School, founded in 1611 by Thomas Cave, has been sold and the proceeds were invested for scholarships in neighbouring grammar schools. The industries comprise the making of printing machines, the spinning and weaving of worsted, printing, tanning and leather-dressing. The Chevin hills, in the

vicinity, yield an exceptionally good building stone which was used for the foundations of the Houses of Parliament. Pop. (1901), 9,230.

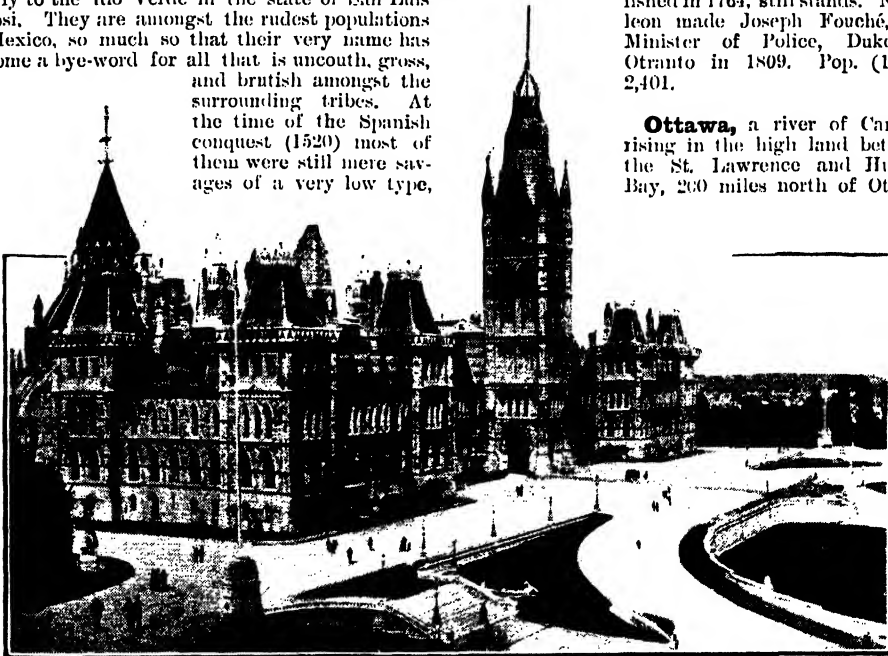
Otomaks, aborigines of Venezuela, whose territory comprises the section of the middle Orinoco between the Apure and Meta confluences. During low water they live on fish and turtles, but during the great floods, when fishing is impossible, they consume large quantities of a fatty earth, a kind of potter's clay, which is collected on the banks of the rivers and stored in their huts. This diet, varied with a few frogs, lizards, and fern-fronds, appears to be in no way injurious, and even in the fishing season some of the earth is taken as a "dessert" after meals. The Otomaks have coarse Mongolian features and a deep coppery colour, being with their Guano neighbours almost the darkest people of all the South American aborigines.

Otomi, a primitive people of the Mexican tableland. They occupy the slopes of the mountains north of the valley of Mexico and thence nearly to the Rio Verde in the state of San Luis Potosi. They are amongst the rudest populations of Mexico, so much so that their very name has become a bye-word for all that is uncouth, gross, and brutish amongst the surrounding tribes. At the time of the Spanish conquest (1520) most of them were still mere savages of a very low type,

the Mazahuas in the Tajimaroa and Zitacuaro Mountains; the Pumes in San Luis Potosi and neighbouring provinces, and the Jonas (Mecons) in Guanajuato. The total population of Otomi speech is estimated at about 650,000.

Otranto, a seaport of the province of Lecce, Italy, on the Strait of Otranto, 42 miles S.E. of Brindisi. There is a large and convenient harbour, and a considerable trade is carried on with the Levant. Even in early times, when it was known as Hydruntum, it had a large maritime traffic. It remained a possession of the Greek emperors till its capture in 1068 by Robert Guiscard, but the deathblow to its prosperity was struck in 1480 by the Turks under Achmet, grand vizier of Mohammed II., who destroyed the town and slew or enslaved the inhabitants. The Cathedral of S. Annunziata is a three-aisled basilica, the mosaic floor of which, dating from 1163, was seriously damaged by the horses of the Turks. The castle which gave the title to Horace Walpole's romance of *The Castle of Otranto*, published in 1764, still stands. Napoleon made Joseph Fouché, his Minister of Police, Duke of Otranto in 1809. Pop. (1901), 2,401.

Ottawa, a river of Canada, rising in the high land between the St. Lawrence and Hudson Bay, 260 miles north of Ottawa



PARLIAMENT BUILDINGS, OTTAWA.

Photo: Topley, Ottawa.

and none had formed any kind of social organisation before the 15th century. But they are specially remarkable for their Hia-hua language, as it is called, which is the only monosyllabic form of speech in the New World, and which is also of exceedingly harsh and difficult utterance. The Otomi group comprises, besides the Otomi proper, the Serranos of the Sierra Gorda in Guanajuato;

city. Flowing westwards for some 200 miles, it then traverses Lake Temiscamingue, whence it takes a mainly south-easterly direction as far as Ottawa city, where it strikes due east and falls into the St. Lawrence at the island of Montreal, having served during more than the latter half of its course as the boundary between Quebec and Ontario. It drains an area of 50,500 square

miles, is 730 miles long, and its chief tributaries are the Conlonge, Gatineau, du Lièvre, and Rouge, on the left, and the Medawaska, Montreal and Blanche, on the right. It is navigable in many stretches, but the Falls of Chaudière (50 feet high and 200 feet wide) above Ottawa city offer an insuperable obstacle to the navigation of the lower stream. The rapids below Ottawa city are negotiated by means of canals, and by the Rideau Canal the river is brought into communication with Lake Ontario at Kingston. The Ottawa is the channel of an immense lumber trade.

Ottawa, the capital of the Dominion of Canada, in the province of Ontario, on the right bank of the river Ottawa, where it is joined by the Rideau, 100 miles W. of Montreal. It is on the Canadian Pacific Railway, and is divided into Upper and Lower Town by the Rideau Canal. Queen Victoria chose it as capital in 1858 to avoid wounding the *amour-propre* of Quebec, Montreal, Kingston, or Toronto. Before 1854 it had been known as Bytown, so named after Colonel By, R.E., who surveyed the site for the Rideau Canal, the construction of which was begun in 1827, and practically was founder of the town. The Parliament Buildings, in the Italian Gothic style, occupy a commanding site on a height overlooking the Ottawa and form an imposing structure, the Victoria Tower rising to a height of 180 feet. The foundation stone was laid in 1860 by the Prince of Wales (afterwards Edward VII.) and the first session was held in 1865. Other important structures are Rideau Hall (the residence of the Governor-General), the Roman Catholic Cathedral of Notre Dame, Christ Church Cathedral, the City Hall, the Court-house, the National Art Gallery, and Ottawa University (Roman Catholic). Lumbering is the leading industry, the cut of timber in the sawmills reaching 275,000,000 feet annually. The trees are felled up country in the winter and drawn to the river ready to be carried to the mills by the spring floods. Other industries include the making of flour, agricultural implements, bricks, ironware, matches, leather, street cars, waggons, calcium carbide, and porcelain and carbon. The Chaudière Falls and the falls on the Rideau provide power for most industrial purposes. Ottawa is the residence of the Anglican bishop of Ontario and of the Roman Catholic bishop of Ottawa. Pop. (1901), 59,928.

Ottawa (OTTOWAY), the name of several groups of North American Indians, all of whom belong to the Algonquin family. The most important are the Canadian Ottawas, who are scattered over an area of 40,000 square miles in the basin of the Ottawa river, named from them, and on the eastern slopes draining to Hudson Bay, most of them being Roman Catholics of French speech. The Ottawas of Michigan are the most numerous section, being estimated at 4,000. Of the Lake Erie Ottawas, not very numerous, some are settled in the Quapaw Agency in Indian Territory, and some with the Ojibways in Manitoulin and Cockburn Islands (situated in the north of Lake Huron and belonging to Ontario).

Otter, an animal of the aquatic sub-family Lutrinæ of the weasel family (Mustelidæ). The body is long and low, with short limbs and short round feet (except in the sea-otter, which has the hind feet fin-like), the toes webbed and armed with curved blunt claws. The type genus (*Lutra*), with



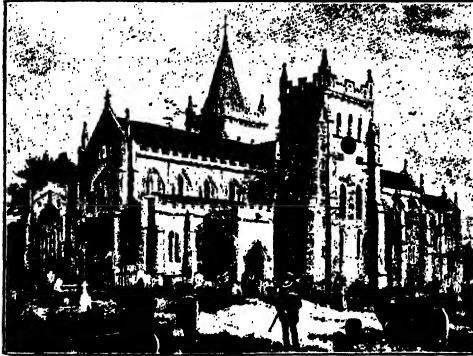
OTTERS.

numerous species, is widely distributed. The common otter (*L. vulgaris*) is British. There is great variation in size, but large specimens may reach a length of forty inches, or a little more, of which the tail counts for about a third. It swims and dives well, and subsists principally on fish. It is rarely met with far from water and makes a nest in a bank or among the roots of a tree overhanging the water. In the East otters are trained to catch fish for their masters and the fur of all the species is of commercial value. The margin-tailed otter (*L. brasiliensis*) sometimes made a distinct genus (*Meromura samouitzi*), on account of the ridge on each side of the tail. The sea-otter (*Lutra*, or *Enhydra lutra*), from the North Pacific, is larger and more stoutly built than the English otter. It feeds on molluscs and crustaceans and its fur is even more valuable than that of the seal.

Otterburn, a village of Redesdale, Northumberland, England, 15 miles S. of the Cheviot Hills. It is famous for the combat on August 19th, 1388, between 2,300 Scots under Douglas and 8,600 English under Percy. The Scots were surprised at supper, but fought with desperate valour and in the end defeated their assailants. Douglas, however, was slain and Percy taken prisoner. The Scots ballad of "Otterburn" is almost a literal account of the affair, while the English "Ballad of Chevy Chase" is composed on more imaginative lines.

Ottery St. Mary, a town of Devonshire, England, on the left bank of the Otter, 12 miles E. of Exeter. The church of St. Mary, dating from the 13th century but enlarged and altered at

different periods afterwards, especially in the 14th century during Grandisson's episcopate, contains several remarkable features. Excepting Exeter Cathedral, it is the only church in England with towers at the transepts, of which the northern one is surmounted by a low octagonal spire. There is some fine fan tracery in the Dorset aisle and the stone reredos, greatly restored, displays beautiful



CHURCH OF ST. MARY, OTTERY ST. MARY.

workmanship. Most of the interior was restored by William Butterfield in 1849-50 at the cost of Sir John Taylor Coleridge, nephew of the poet-philosopher, Samuel Taylor Coleridge (who was born here in 1772), and father of Lord Coleridge, the Lord Chief Justice. The grammar school founded by Henry VIII, when St. Mary's College was dissolved was taken down in 1884. Coleridge's father was headmaster as well as vicar of the parish. Among its pupils were S. T. Coleridge, Richard Hurrell Froude and Bishop Patteson. Sir Walter Raleigh stayed for some time at Ottery St. Mary, which, under the guise of "Clavering St. Mary," figures in *Pendennis*. Pop. (1901), 3,495.

Otto of Roses. [ATTAR OF ROSES.]

Otway, THOMAS, dramatist, was born at Trotton, near Midhurst, Sussex, on March 3rd, 1651. He was educated at Winchester and Christ Church, Oxford, and came to London to try his fortune as an actor. Here he met with failure and turned his attention to play-writing. In 1675 appeared *Alcibiades* and in 1676 his *Don Carlos* proved a success. The Earl of Plymouth, son of Charles II., patronised him and obtained for him a commission as cornet. He went to Flanders, but soon returned to poverty in England and again wrote for the stage. Besides adapting from Racine and Molière, he produced in 1680 *The Orphan* and in 1682 *Tenice Preserved*, these being the pieces on which his reputation chiefly rests. He also wrote comedies, which share the coarseness and libertinism of the age. His writing is forcible and sympathetic. He died poor in London on April 14th, 1685.

Oubliette (French, *oublier*, "to forget"), a dungeon in which prisoners condemned to perpetual

confinement were thrust. The only access was by an opening at the top which also served to admit air. The victim was let down by ropes and often left to perish in secret. In the floor there was sometimes an opening to a lower pit into which the body was thrown. Sir Richard Burton says that they are common in old Eastern houses, where they are so well concealed that the modern inmate is often ignorant of their existence.

Oudenarde, a town of East Flanders, Belgium, on the Scheldt, 15 miles S.S.W. of Ghent. It has a 16th-century Hôtel-de-ville, with a fine tower, and some good churches. The manufactures include textiles, lace, tobacco, leather, and starch, and there are also dyeing works, bleachfields, salt-refiners and distilleries. The town has several times been besieged and was the scene, on July 11th, 1708, of the battle in which Marlborough and Prince Eugène defeated the French. Pop. (1900), 6,204.

Oudh, a province of India, bounded on the N.E. by Nepal, on the N.W. by Rohilkhand, on the S.W. by the Ganges, on the S.E. by Benares and on the E. by Basti. It occupies an area of 23,966 square miles. The surface is mostly a rich alluvial plain, but there is some jungle. It is watered by the Rapti, Gogra, Gunti and other affluents of the Ganges. The chief crops are rice, wheat, barley, maize, pulse, millet, sugar-cane, and oil-seeds, though cotton, tobacco, poppy, and indigo are also grown. Manufactures are insignificant, the industries being almost wholly native—such as weaving, pottery, smith's work, gold and silver lace-work, muslin, and embroidery. Hindus are in a vast majority, but the number of Mahomedans is considerable. Once a Mogul province, Oudh became subordinate to England in 1765, was annexed in 1856, becoming a hot-bed of mutiny in the next year. The town of Oudh, on the Gogra, formerly the capital, is much venerated by the Hindus. The present capital is Lucknow (264,049). Pop. of Oudh (1901), 12,833,077.

Oudinot, CHARLES NICOLAS, general, was born at Bar-le-duc, in the department of Meuse, France, on April 25th, 1767. He entered the army for a time, and then, after a brief experience of trade, returned to it as commander of Volunteers in 1791. He distinguished himself in many engagements with the army of the Rhine and by 1799 became general of division. He was in favour with Masséna, and did good service in Italy, especially at the battle of Miucio. Later Napoleon put him in command of his advance guard and he again distinguished himself notably at Wagram (1809), being made Marshal of France and Duke of Reggio in reward. He led the retreat from Moscow. After this he retired, but returned to the service in 1814. At Napoleon's fall he joined the Royalists and was made peer of France. In 1842 he was appointed Governor of the Hôtel des Invalides, retaining the post till his death, in Paris, on September 13th, 1847. His son, **NICOLAS CHARLES VICTOR OUDINOT** (1791-1863), was a general in the French army and took an active interest in politics, retiring into private life soon after the *Coup d'état* of 1851.

Ouida, the name under which the novelist LOUISE DE LA RAMÉE publishes her works. She was born at Bury St. Edmunds, Suffolk, in 1810. Her father was English, her mother French, and she has spent most of her life in Florence. As early as 1861 she wrote for magazines. Among the best known of her novels are *Under Two Flags* (1867), *Puck* (1870), *A Day of Flanders* (1872), *Two Little Wooden Shoes* (1874), *Moths* (1880), *Wanda* (1883), *Gilderoy* (1889), *The Silver Christ* (1894), and *The Waters of Edera* (1900). She has always actively aided every movement for the prevention of cruelty to animals.

Ouless, WALTER WILLIAM, painter, was born at St. Heliers, Jersey, on September 21st, 1848. He was educated at Victoria College, Jersey, and came to London in 1864. He attended the Royal Academy Schools in 1865 and has been a constant exhibitor at Burlington House since 1869. He was elected A.R.A. in 1877, and R.A. in 1881. He has painted many successful portraits, among them being those of Charles Darwin and Cardinal Newman.

Ounce. Ounce and Inch are doublets, both being derived from the Latin *Uncia*, the twelfth part of any weight or measure. An ounce is the twelfth part of a pound troy, but the sixteenth part of a pound avoirdupois. In the former it contains 480 grains (20 dwt.), in the latter 437½ grains.

Ounce (*Felis uncia*), the Snow Leopard, from the mountains of central Asia. *Felis onca* is the jaguar.

Oundle, a town of Northamptonshire, England, on the Nen, 13 miles S.W. of Peterborough. The church of St. Peter, a large building of different periods, has a panelled tower ending in an octagonal crenelated spire 208 feet high. There are several charities in the town, notably Latham's Hospital, founded in 1611 for the maintenance of aged women, and the Laxton Endowment. Sir William Laxton, who had acted as Lord Mayor of London, left an estate in London City, in 1556, for the upkeep of a school and almshouses. The foundation now supports Oundle School (elementary) and Laxton School (second-grade), and the almshouses have been rebuilt. Four miles north of Oundle stood the Castle of FOTHERINGHAY, built early in the 12th century, of which there only remain a few fragments of the walls, with the moats. It was the chief seat of the Plantagenets and the birthplace of Richard III. (1452), but is especially memorable as the place where luckless, lovely Mary Queen of Scots was imprisoned, tried and beheaded (1587). Pop. of Oundle (1901), 2,890.

Ouse, a river of Yorkshire, England, formed by the junction, near Boroughbridge, of the Swale and the Ure. It flows south-east past York, Selby, and Goole, and 8 miles east of Goole unites with the Trent to form the Humber. It receives the Nidd, Wharfe, Aire, and Don on the right, and the Foss and Derwent on the left. The length of its course is 60 miles and it is navigable to York by large vessels.

Ouse, the GREAT, a river of England, rising in the south-west of Northamptonshire. Pursuing in some parts a very serpentine course it flows north-eastwards through the shires of Buckingham, Bedford, Huntingdon, Cambridge and Norfolk, falling into the Wash near King's Lynn. It is 160 miles long and navigable for the last two-thirds of its run. It receives, on the right, the Ivel, Cam or Granta, Lark, Brandon or Little Ouse, Wissey or Stoke, and Nar, and, on the left, the Tove and Kym.

Onseley, SIR FREDERICK ARTHUR GORE, musician and composer, was born in London on August 12th, 1825, and educated privately, and at Christ Church, Oxford. He succeeded to the baronetcy in 1844, took holy orders in 1848, and became Mus. Doc. of Oxford in 1854 and, in the following year, Professor of Music in the University. He was appointed Canon residentiary of Hereford Cathedral in 1886, and died at Hereford on April 6th, 1889. He bequeathed his valuable music library to the college of St. Michael, Tenbury, which he had partly built and endowed. He edited *Neumann's History of Music*, wrote a *Treatise on Harmony* (1868), a *Treatise on Counterpoint* (1869), and a *Treatise on Musical Form* (1875), and the oratorios *St. Polycarp* (1855) and *Magyar* (1873).

Oustitis. [MARMOSET.]

Outcrop, or BASSET EDGE, the exposure of a rock at the surface. The width of the outcrop depends both on the dip or variation from horizontality and on the thickness of a stratum. Its general direction on the map is termed the strike. The outcrop of soft rocks will often be flat, whilst that of relatively harder ones may stand up as an escarpment.

Outlanders, or UTLANDERS, the name given in the Transvaal to the alien whites who settled there (particularly in Johannesburg) in large numbers after the discovery of gold in 1885. Their grievances ultimately became the cause of serious friction between the Boers and the British Government in 1898-9, and formed the pretext for the South African War of 1899-1902.

Outram, SIR JAMES, lieutenant-general, was born at Butterley Hall, Derbyshire, on January 29th, 1803. He was educated at Aberdeen and in 1819 went to India as a cadet. In 1828 he subdued and afterwards trained to discipline the Bheels. In 1838 he took part in the Afghan War, and was present at the capture of Kelat (1839), and in the same year made a daring ride in disguise through the enemy's country. He was appointed political agent in Sind, in succession to Colonel Pottinger, and took up his duties in 1840, devoting himself largely to the redress of grievances. He came into collision with the authorities in connection with the Afghan complications in 1842, but at a dinner in his honour at Sakhar on November 5th of that year, Sir Charles Napier proposed his health in terms that have stuck—"Gentlemen, I give you the Bayard of India, *sans peur et sans reproche*, Major

James Outram of the Bombay army." This high compliment did not prevent him from opposing Napier's policy which led to the annexation of Sind. After a brief holiday in England he returned to India, where he was cavalierly treated by Lord Ellenborough. Later he was appointed British Resident at Baroda, where his efforts to put down corruption ended in his removal from the post. In 1854 he was promoted major-general and next year became Resident at Lucknow. Reporting that the condition of Oudh was deplorable, he recommended annexation as the only remedy. In 1856 he was made K.C.B. and early in 1857 was entrusted with the command in the Persian War, which he concluded after a campaign of three months, in time to take part in the suppression of the Indian Mutiny. During some of the relief operations, waiving his superior rank, he served as a volunteer under Havelock. After the rebellion had been crushed he was created a baronet and promoted lieutenant-general. His health gradually gave way and he died at Pau, in France, on March 11th, 1863.

Ouzel, OUSEL (literally "a bird," from Old French *oiseil*), the blackbird. [DIPPER, KING-OUSEL.]

Ovambo (OVAMPO), a large Bantu nation of south-west Africa, who give their name to the region (Ovamboland) which stretches from the Cunene river southwards to Damaraland. The Ovambo, *i.e.*, "Settled People," are so called by their Damara (Herero) neighbours because all are agriculturists, living in fixed settlements about the lagoons and watercourses south of the Cunene. They have themselves no collective national name, but form twelve distinct and mostly hostile groups, of which the most powerful are the Ondongas, who claim a sort of overlordship over all the rest. It was the Ondonga chief who in 1881 sold a vast tract of land south of Lake Etosha to the Afrikaner Jordan, founder of the ephemeral Boer republic of Upingtonia. By the Treaty of Lisbon of 1886 the Ovambo territory was divided into two sections, the northern being annexed to the Portuguese colony of Angola, the southern to the German protectorate of south-west Africa. The Ovambos, who are a fine race, tall, robust and well-proportioned, with Negroid features, speak several marked dialects of a Bantu language closely related to that of their Ova-Herero neighbours.

Ovary. The ovaries in the human female subject are two oval bodies which lie on either side of the uterus, enclosed in the broad ligament of that organ. Each ovary measures about an inch and a half by three-quarters of an inch, and is nearly half an inch in thickness; it is attached by what is called the ligament of the ovary to the uterus, and is also attached to the Fallopian tube, which receives the ovum discharged from the ovary at the time of ovulation (*i.e.*, at or about the period of menstruation) and transmits it to the uterus. The ovum is enveloped by a dense capsule (*tunica albuginea*), and is composed of a peculiar connective tissue stroma with interspersed follicles, the

Graafian vesicles. In each of these vesicles there is developed an ovum, and when the vesicle matures it increases in size, its periphery approximates to the surface of the ovary, and rupture of the vesicle ultimately occurs with discharge of the contained ovum.

Diseases of the Ovary. The ovary is sometimes affected by inflammation, and may be the seat of a new growth. The huge cysts which develop in connection with the ovary, and which if left to pursue their natural course attain a very great size, have been successfully treated by operation. At one time the merely palliative method of tapping such ovarian cysts was resorted to; in the first half of the 19th century removal of the cyst was attempted in several instances, but the results were not very encouraging, there being a large percentage of deaths. Modern operators have, however, demonstrated that ovariectomy, as it is called, is a procedure which in competent hands is only attended with a very small degree of risk to life, and they have thus rendered amenable to treatment what was in former days a horrible and usually fatal disease.

Oven. The kind of oven which is still mainly used by bakers is a low reverberatory chamber with an arched roof. The sole or floor of the oven is commonly of stone. The dough is inserted through a door in the face with a long wooden spade, termed a "peel." Such an oven may be heated either externally by means of a furnace at the front corners—the products of combustion passing through an opening into the oven—or internally, a fire being lighted within it, or a "chaffer" being moved about in the inside. In the latter case wood is the best fuel, but when the furnace is heated from without it is usual to employ coal. Many improvements have been introduced in the construction of ovens. Thus it is common now to have a furnace underneath the sole, with flues arranged round the oven into which the gases from the furnace enter. If it is desired to heat the oven internally as well as externally, the gases can be admitted into it through openings worked with valves or dampers.

Oven-Bird, a name for any bird of the South American Passerine genus *Furnarius*, being so called from their dome-shaped nests, with the entrance at the side. The name is less properly applied to the willow-wren.

Overbeck, FRIEDRICH, painter, was born at Lübeck, Germany, on July 3rd, 1789. He went to study at the Vienna Academy in 1806 and to Rome in 1810. Here, with his comrades, Cornelius, Schadow, and Veit, he formed a new school in art, the principle of which was a return to the method of the old pre-Renaissance painters. In 1811 he painted a "Madonna," and followed this up by frescoes of "Joseph Sold by his Brethren" and "Seven Years of Famine." He confined himself to devotional subjects, and in 1813 joined the Roman Catholic Church. Other notable works of his are the "Entry of Christ into Jerusalem" and the "Influence of Christianity upon Art," and five frescoes

on subjects taken from the "Jerusalem Delivered." He designed in charcoal and chalk, and his frescoes were better than his oil-paintings. He died in Rome on November 12th, 1869.

Overbury, SIR THOMAS, poet, was born at Compton Scorpion, Warwickshire, in 1581, and was educated privately and at Queen's College, Oxford. After studying for the Bar for a time, he went to Court, where he was patronised by Robert Carr, whom he had met during a holiday in Edinburgh and who procured him a knighthood in 1608. When Carr (created Viscount Rochester in 1610) wished to marry his mistress, the Countess of Essex, Overbury opposed the project, and so incurred the enmity of Rochester and the Countess, who first tried to compass his death and then to get rid of him by appointing him to a foreign mission. Overbury declined this, and was committed to the Tower of London on April 26th, 1613, on a charge of disobedience to the king's wishes, and here he was slowly poisoned (September 15th, 1613) at the instigation of Rochester and his wife. It was nearly two years before the fact of the murder leaked out, but in November, 1615, the crime was brought home to the authors of it. The four accomplices were executed in that month, and the Earl and Countess of Somerset—the title Rochester had assumed on his promotion in the peerage—were tried in May, 1616, convicted, but afterwards pardoned by the king; they were released from the Tower in 1621. Sir Thomas Overbury's chief work was a little poem on marriage entitled *A Wife*, which was published in 1614 and, owing to his tragic end, which excited general detestation, enjoyed great vogue for many years.

Overland Route. Thomas Waghorn (1800–1850) a lieutenant in the navy, realising the enormous gain which would result from a more rapid transit between England and India, in 1829 made a test journey carrying despatches to Bombay. He returned to London within three months, the time then occupied by the fastest steamers for the outward journey alone. Having proved his project feasible the next difficulty to overcome was to arrange a regular service across the desert in connection with steamers down the Red Sea. The Arabs soon learned that it was to their advantage to further his proposals. Waghorn then established halting-places between Cairo and Suez, and a route which had been infested by robbers became a safe highway. He was author of several pamphlets, including *Particulars of an Overland Journey from London to Bombay by Way of the Continent, Egypt, and the Red Sea*, and in 1888 a statue was erected at Chatham in memory of his valuable services. The voyage round the Cape of Good Hope was more than 12,000 miles. The distance was reduced by half and the saving of time was even more considerable. The opening of the railway from Alexandria to Suez, in 1858, and the opening of the Suez Canal, in 1869, still further accelerated the journey, and mails from London are now landed in Bombay in 13 or 14 days. The route across France, Switzerland and Italy to Brindisi by rail and thence by steamship is now taken not only to India,

Burma, China and the Far East, but also to Australia and New Zealand.

Overlap, the extension of a bed of rock beyond the surface of that immediately underlying it on to a yet older stratum. It generally indicates an extension of the area of deposit owing to depression.

Overstone, SAMUEL JONES LOYD, BARON, banker, was born in London on September 25th, 1796. His father was the Rev. Lewis Lloyd, a Welsh Dissenting minister, and his mother the only daughter of John Jones, a banker of Manchester. After his education at Eton and Trinity College, Cambridge, Samuel entered Jones's Bank, in which his father (retiring from the ministry) had become a partner, and which was merged, in 1834, in the London and Westminster Bank. From 1819 to 1826 he represented Hythe in Parliament, and in 1860 was raised to the peerage. He died in London on November 17th, 1883. He wrote tracts upon the Bank of England, and his pamphlet on the Currency Question had great influence upon the provisions of the Bank Charter Act of 1844. Lord Overstone was strongly opposed to the principle of limited liability and the metric system.

Overture (French, *ouverture*, "an opening"), an instrumental prelude to an opera or oratorio, the form of which may vary from a brief medley of melodies comprised in the work it precedes to an elaborate orchestral piece complete in itself. Its development is due to Lulli (1633–1687), a Florentine composer who settled in Paris, and by making the ballet an essential part of opera achieved success. Until his time the prelude had consisted of a few preliminary bars, a mere instrumental flourish. Lulli deserves to rank as an inventor. He amplified and fixed the form of the prelude: a slow Introduction, repeated, followed by a fugued Allegro, usually succeeded by a movement in the dance-form. His overtures served not only as the model followed by his successors for nearly a century, but were themselves used by other composers for their own operas. The ballet becoming so important a feature, and the dance music of that period being of a stately order, the blending of styles did not jar on the artistic sense. Purcell followed Lulli and Handel developed the model, assigning to the overture increasing importance, his conservatism in this respect being in strong contrast to the innovations of his choral writing. Gluck gave to the overture the dramatic character of the music which was to come, realising the propriety of uniformity of style. In Mozart, Gluck's influence is traceable, and since his time the principles of form which govern the first movement of a symphony have been followed. Its highest development was attained to by Beethoven who, asserting his independence of precedent, reached the climax of musical expression in his magnificent third overture (1806) of the four he composed for *Fidelio*. The overtures of Weber are highly effective in their skilful anticipation of themes, but with Rossini they became mere pot-pourris,

pleasing and mostly unimportant. Wagner reinstated their dignity with his superb overture to *Tannhäuser*, wherein movements in that opera are blended into an artistic whole, the orchestration being elaborate and exquisite. In the later music-dramas Wagner begins with a brief Prelude, leading without a break into the opening scene. The name overture is also used for detached concert pieces, the titles of which are, in a sense, the key to the composer's intention. Berlioz, Schumann and Mendelssohn produced many fine works of this class. Wagner considered Mendelssohn "a landscape-painter of the first order," and *The Hebrides* overture his "masterpiece."

Overijssel, a province of Holland, bounded on the N.W. by the Zuyder Zee, on the N. by Friesland and Drenthe, on the N.E. by Hanover, on the S.E. by Westphalia, and on the S. and S.W. by Guelderland. It has an area of 1,291 square miles. The surface is flat, nowhere exceeding 230 feet above sea-level, and is watered by the Yssel, Regge, Vecht, and other streams and canals, considerable tracts being marshy or heath lands. Agriculture, including stock-raising and dairy-farming, is the chief industry, though in the district of Twente there are cotton mills and bleachfields, brick- and tile-making on the Yssel banks, and the fisheries are of some consequence. Pop. (1900), 333,408.

Ovid (PUBLIUS OVIDIUS NASO), poet, was born on March 20th, 43 B.C., at Sulmo (Solmona), in the Abruzzi, Italy. He studied rhetoric with a view to the Bar; but, the death of his elder brother setting him free from this necessity, he went to Athens to study Greek and then travelled in Asia Minor in company with another poet. On his return to Rome he filled some State offices, but his easygoing nature and love of pleasure left no room for ambition. He divorced two wives, and was credited with having Julia, daughter of Augustus, as a mistress. He married later a third wife, by whom he had a much-loved daughter. He lived at Rome till his fiftieth year, when, for some reason unknown, Augustus banished him to Tomi, near the mouth of the Danube, where he died in A.D. 17, but not till he had won the esteem of his new fellow-citizens. Of his works the best known are *Ars amatoria*, the *Metamorphoses*, the *Fasti*, the *Tristia* (elegies) and the *Epistole*.

Oviedo, a town of the province of Oviedo (the ancient Asturias), Spain, on the Nalon, 16 miles from the Bay of Biscay and 230 miles N.N.W. of Madrid. The cathedral, rebuilt in the 14th and 15th centuries, is one of the grandest in Spain and contains the remains of several of the old kings and queens of Asturias. Other buildings include the college of San Vicente, the convent of San Pelayo, the University, the Court of Justice, and the Castle. The manufactures include textiles, arms, powder, hats, leather and, in the vicinity, ironworks. Pop. (1897), 46,376. The province of OVIEDO, 4,091 square miles in area, is on the Bay of Biscay. The mountainous interior contains good pasture-land, and many cattle, goats, and swine are reared. The mineral wealth is of great importance, the mines

including quicksilver, iron, copper, coal, zinc, and manganese. Linens, woollens, leather, paper, porcelain and glass, agricultural implements, and ribbons are manufactured. Pop. (1897), 612,663.

Oviparous, laying eggs which are hatched outside the body of the parent. Most invertebrates, fishes, and reptiles, all birds, and the monotremes are oviparous. The term ovoviviparous is applied to those animals the eggs of which are hatched within the body of the parent, while viviparous is used of the marsupial and placental mammals and their gestation.

Ovule, the unfertilised seed in flowering plants. It may be naked, as in Gymnosperms, or enclosed in an ovary, as in Angiosperms; and may be solitary in each chamber of the ovary, or one of a number. The Compositæ and Gramineæ have but one ovule to each flower; the Ranunculaceæ and Umbellifereæ one to each carpel; and the Drupaceæ two, and the Cupulifereæ sometimes as many as six, only one, as a rule, becoming a seed. The ovule in the yew and the Polygonaceæ seems to be the apex of an axial or stem structure; in Ginkgo, the Compositæ, and the Primulaceæ it appears lateral, or homologous to a leaf; in the majority of plants it is undoubtedly a marginal leaf-structure, homologous to a lobe of the leaf; and in the poppies and water-lilies, where ovules are scattered over the surface of the carpel, they are apparently the homologues of hairs. [PLACENTATION.] The ovule originates in a cellular papilla on the placenta, known as the nucelus, or preferably as the micellus or tercene, which is carried up on a stalk or funicle and enclosed by one or two coats, the secundine and primine, developed from its base or chalazæ. These coats leave an opening at its apex, the micropyle, through which the pollen-tube enters in fertilisation, and the radicle makes its exit in germination. The ovule may be atropous, orthotropous, or ambent, as in the Polygonaceæ, with a short funicle; but more commonly, as in Compositæ, Leguminosæ, Umbellifereæ, Cupulifereæ, and Jiliaceæ, it is inverted or anatropous, owing to the rapid growth of the funicle, which adheres to the side of the ovule and is termed the raphe. In this way the micropyle is brought near to the placenta down which the pollen-tubes find their way. The same result is also, but less commonly, brought about, as in Crucifereæ and Malvaceæ, by the ovule becoming campylotropous, or entirely bent on itself, the funicle remaining short.

Ovulites, a genus of fossils, minute in size and ovoid, cylindrical, or drumstick-like in shape, which occur in the lower Cretaceous rocks of France and the West Indies. They were originally described as Foraminifera, but are now more usually regarded as small calcareous algae.

Ovum, the single cell from which a multicellular animal develops, usually after fertilisation by another cell which represents the male element. In the simpler animals the ovum is one of the cells of either of the two membranes (ectoderm and endoderm) forming the wall of the body, but in higher animals it is one of the cells of a special

organ called the ovary. The ovum may be composed simply of protoplasm and a nucleus, or it may have one or more envelopes; it generally contains some food material (deuterooplasm) which may be mixed up with it or be included with the ovum in an egg-shell; it is then absorbed during the subdivision and growth of the ovum. Before fertilisation the ovum undergoes the process of karyokinesis, when half of the nucleus is expelled; the remaining half may undergo the same process. The ovum is then quiescent until it is stimulated to development by union with a spermatozoon or male element; this, however, is not necessary in some cases, which may develop directly a process known as parthenogenesis.

Owen, JOHN, theologian, was born at Studhampton, Oxfordshire, of which his father was vicar, in 1616, and educated at Queen's College, Oxford. Rather than submit to Laud's new statutes he left the University in 1637, and became tutor in Sir Robert Dormer's family, and chaplain to Lord Lovelace. From Presbyterianism to Independent tenets was his next step, and he preached at Whitehall the day after King Charles's death, and accompanied Cromwell to Ireland and Scotland. In 1651 Cromwell made him Dean of Christ Church, Oxford, and Vice-Chancellor of the University the next year, but he was deprived of the latter post in 1658, and was ejected from Christ Church in March, 1659. He had been made D.D. in 1653. In 1658 he took part in the Savoy Conference. After the Restoration he was offered a large preferment in the Church of England if he would only conform, but he remained staunch to his principles. In his later years he was engaged in several works of a theological and controversial character. He died in London on August 24th, 1683, and was buried in Bunhill Fields. With Richard Baxter and John Howe, Owen must be placed amongst the greatest of the Puritan divines. Among his writings are *Exercitations on the Epistle to the Hebrews* (1668), *Discourse on the Holy Spirit* (1671), *Doctrine of Justification by Faith* (1677), and *Account of the Nature of the Protestant Religion* (1682).

Owen, SIR RICHARD, naturalist and comparative anatomist, was born at Lancaster on July 20th, 1804. He was educated at Lancaster Grammar School, where one of his schoolfellows was William Whewell, afterwards Master of Trinity, Cambridge, with whom he enjoyed a life-long friendship. Owen then proceeded to Edinburgh, and later to St. Bartholomew's Hospital, London, where he obtained his diploma, and was the pupil of Abernethy, who was so struck by Owen's anatomical tastes as to cause his employment in cataloguing the Hunterian collection at the Royal College of Surgeons. Here Owen laboured—first as assistant conservator (1827) and afterwards as sole conservator (1843) till 1855, having married, in 1835, the daughter of William Clift, his colleague and predecessor in the conservatorship. From 1834, in which year he was elected F.R.S., to 1856 he lectured in comparative anatomy at St. Bartholomew's and the College of Surgeons. He had much to do

with developing the Zoological Society, and sat on various Health Commissions, and had the duty of arranging the models of extinct animals for the Exhibition of 1851, and later in the grounds of the Crystal Palace at Sydenham. In 1856 he was appointed head of the natural history department at the British Museum, and did not rest till he had brought about the removal of the department to South Kensington, resigning his post in 1883, when the task of arrangement had been well-nigh completed. The Queen gave him Sheen Lodge, in Richmond Park, where he died on December 18th, 1892. He was made K.C.B. in 1884, and many other distinctions, foreign and English, were bestowed upon him. His chief works included *Lectures on the Comparative Anatomy and Physiology of the Invertebrate Animals* (1843); *A History of British Fossil Mammals and Birds* (1846); *A History of British Fossil Reptiles* (1849-84); *On Parthenogenesis* (1849); *On the Anatomy of Vertebrates* (1866-8); *Memoir on the Dodo* (1866); *Researches on the Fossil Remains of the Extinct Mammals of Australia* (1877-8); and *Memoirs on the Extinct Wingless Birds of New Zealand* (1879). He was a strong opponent of the Darwinian doctrine of natural selection, and Sir William Flower, his successor in the Directorate of the Natural History Museum, says that Owen's attitude on the subject provoked as much resentment as a man of Darwin's magnanimity was capable of exhibiting.

Owen, ROBERT, Socialist, was born at Newtown, Montgomeryshire, on May 14th, 1771, and received a somewhat casual education. After serving as assistant in several trades, chiefly hosiery, he drifted into the cotton-spinning business. At 23 he was managing a mill at Chorlton and in 1799 undertook the control of the mills at New Lanark, on the Clyde, which had been started in 1785 by David Dale, whose daughter Owen married in 1799. The mills ultimately became one of the show-places of the United Kingdom. In 1814 the business passed into the hands of a company of which Owen was managing director, other members being William Allen, Joseph Fox, and Jeremy Bentham. It was conducted on Socialistic principles, all profits above 5 per cent. going to the benefit of the work-people or the community at large. In 1813 he published a *New View of Society* and travelled in Great Britain and the United States to inculcate his ideas. Among them was a plan for exchanging all products by means of a paper currency of labour notes, goods being valued in terms of the labour it took to produce them. This had a partial trial, but he alienated support by his secularist views. He saw his communities tried and found a failure in the United States, Scotland, and England. Meanwhile, however, much friction had arisen among Owen and his associates in the management at New Lanark and in 1829 he finally withdrew from the control of the concern. He had not lost his belief in Co-operation, and took for many years a leading part in promoting the movement, setting forth his views in a *Book of the New Moral World*, published in sections between 1826 and 1844. From 1854 he

became a spiritualist, and died at Newtown on November 17th, 1858.

Owens College, Manchester, was founded by John Owens (1790-1846), a cotton-spinner of Manchester, who in 1846 bequeathed a sum of nearly £100,000 to establish a college of non-sectarian character. The original college, erected in 1851, was replaced by new buildings in 1873. The endowment having been raised to more than £300,000 by the gifts of Charles Clifton (1874), Charles Beyer (1876), and others, the college was in 1880 combined with others into the Victoria University. This constitution lasted till 1902, in which year the college petitioned the Privy Council for the creation of an independent University for Manchester. Accordingly on the 15th of July, 1903, a new and more liberal charter was issued reconstituting the university as the Victoria University of Manchester. The constituent colleges of the original Victoria University also acquired an independent status. University College, Liverpool, became the University of Liverpool (1903) and the Yorkshire College of Leeds the University of Leeds (1904).

Owl, a bird of the Raptorial family Strigidae, often termed nocturnal birds of prey, though some few are as diurnal in habit as other members of the order. Owls are universally distributed. They vary greatly in size, the smallest being only a few inches in length, while the Eagle Owls reach, and sometimes exceed, two feet; and the females are generally larger than their mates. The head is large and broad, and the face short; the eyes are large and look directly forward, and are surrounded by a concave disc of feathers, best developed in the nocturnal forms, that serve to concentrate the rays of light. The bill is hooked, but has no "teeth"; and the nostrils do not open in the cere, as in the diurnal birds of prey, but at its border. The sense of hearing is acute, and the ear has an external opening, sometimes covered with a fold of skin. These openings are about on a level with the eyes, and below the plumicorns or feather-tufts in the Eared or Horned Owls, with which there is no connection. The legs are short and feathered to, and sometimes over, the toes, which are four in number, and armed with strong claws. The outer toe is reversible, so that the foot in some degree resembles that of Climbing Birds. Owls are exclusively animal feeders, and prey on small mammals, birds, reptiles, amphibians and fishes, and beetles and other insects. Many classifications have been suggested. That generally adopted divides these birds into an Alucine (= the Strigide of Sharpe) and a Strigine (= the Bubonide of Sharpe) section with the Barn Owl and the Wood Owl (both British) as the respective types. The Eared Owls belong to the genus *Asio*, which has two British species—the Long-eared Owl (*A. otus*), which carries the plumicorns erect, and the Short-eared Owl (*A. accipitrinus*), which generally has them depressed, though they are erectile at will. In Great Britain this species is sometimes called the Woodcock Owl, because the two birds often arrive about the same time. The Eagle Owls belong to the genus *Bubo*, and

contain the largest forms. The Great Eagle Owl (*B. maximus*) is a rare British visitor. The Hawk Owls form the genus *Surnia*, the species of which are more or less diurnal. The Snowy Owl (*Nyctea*



LONG-EARED OWL.

scandiaca), an Arctic form, having white plumage marked with brown, is a rare visitor, as is also *Scops asio*, which was probably the bird of Athena. The Burrowing Owls of the genus *Athene* or *Speotylo* are American.

Ox. [CATTLE.]

Oxalic Acid, $C_2H_2O_4$, occurs in many plants, usually in combination with potash—*e.g.*, in wood sorrel, rhubarb, etc. Its lime salt also forms the chief constituent of urinary calculi. It may be obtained from the plant sources or prepared synthetically by numerous interesting and significant reactions. Its commercial manufacture is, however, effected by heating in shallow trays sawdust with potash or a mixture of potash and soda, lime being frequently added. The exact details of the production are kept closely as trade secrets. By the reaction salts of oxalic acid are formed which are converted to the calcium salt by the addition of lime. From this the acid is then liberated by means of sulphuric acid. It crystallises with water to form monoclinic crystals of specific gravity 1.64 easily soluble in water, the solution forming a strong reducing agent. It is a powerful poison. Commercially it is largely employed in dyeing and calico-printing, in the manufacture of inks, dyes, and other chemical products, while its salts also find numerous applications. The potassium salt is known as salts of lemon. It is used for removing ink-stains and is also employed in photography.

Oxenstierna, AXEL, COUNT, statesman, was born at Fano, Upland, Sweden, on June 16th, 1583. He studied theology at Rostock, Wittenberg and Jena, and then visited different German courts. In 1606 he was sent on a mission to Mecklenburg and in 1609 became senator. He was at the head of the regency till the accession of Gustavus Adolphus,

when he became Chancellor. In 1614 he accompanied the king to Germany, and was made governor-general of the conquered provinces, with headquarters at Mainz. After the death of Gustavus Adolphus at Lützen in 1632, Oxenstierna summoned a congress at Heilbrom, and was the acknowledged chief of the Protestant League. In 1636 he was Chancellor of Sweden and aided Queen Christina in many ways, until her determination to abdicate drove him from public affairs. The queen created him count in 1645 after his return from the negotiations with the Danes which ended in the Treaty of Brömsebro. He died in Stockholm on August 28th, 1654.

Oxford, the county town of Oxfordshire, a cathedral city, and the seat of one of the most famous universities in the world, at the confluence of the Cherwell with the Thames (here known as the Isis), the older part of the city lying between the river, 52 miles W.N.W. of London. Founded



MAGDALEN COLLEGE TOWER.

[Photo: Gibbun & Co., Oxford.]

in 727, when St. Frideswyde established a nunnery where Christ Church now stands, it was fortified in 912 by Edward the Elder, burnt by the Danes in 1009 and submitted to Sweyn in 1013. Here Edmund Ironside was killed in 1017 and in 1018 was held the first of many Parliaments, notably those of 1213 (in John's reign), 1258 (when the Mad Parliament framed the Provisions of Oxford), 1625 (Charles I., whom Oxford stoutly supported) and

1680-1 (Charles II.). In 1142 Stephen besieged the Empress Maud in the castle. Richard I. (1157) and John (1167) were born here, and here Latimer and Ridley (1555) and Cranmer (1556) were burnt at the stake. In 1687 James II. visited the city in his attempt to intrude a Roman Catholic president on Magdalen College. Buildings of the first rank are so numerous and architecturally so fine that the city is one of the most beautiful in England. Most of the colleges are housed in structures of unique charm and the designs of a few are of superlative excellence, for example, the tower, perfect in its symmetry, and the lovely cloisters of Magdalen College. Apart from such buildings may be mentioned the remnant of the castle; Christ Church Cathedral (the smallest in England); St. Mary's (the University Church), of which John Henry Newman was vicar and where the Bampton Lectures are delivered; the Sheldonian Theatre, where Commemoration is held in June; the Examination Schools, designed by T. G. Jackson, R.A.; the Bodleian Library (1602), whose fame is only eclipsed by that of the British Museum; the Divinity School, a remarkable example of the Perpendicular style; the Radcliffe Library, from the dome of which an exquisite panoramic view of the city can be had; the Radcliffe Infirmary; the Ashmolean Museum, containing the collection presented (1679) to the University by Elias Ashmole; the Taylor Institution, founded by Sir Robert Taylor (d. 1788) to encourage the teaching of European languages; the Indian Institute for the promotion of the study of Indian subjects; the Clarendon Building which, till 1830, was the University Press, now accommodated in premises of its own; the Town Hall and Municipal Buildings (1893); the Corn Exchange (1894); the County Hall and Assize Courts (1841), occupying part of the site of the castle; the Probate Court (1864) and the Prison, in which have been incorporated ("to such base uses") portions of the castle. Near Balliol is the Martyrs' Memorial (1841), designed on the model of one of the Queen Eleanor crosses, in honour of the martyred bishops. Nor does the city lack for public spaces. Besides the Botanic Garden, dating from 1633, there are gardens, meadows, and walks in connection with most of the colleges. The Broad Walk at Christ Church and Addison's Walk at Magdalen are especially noteworthy, while the Gardens of New are exceptionally beautiful and contain the most complete relic of the old city wall. The Parks is a fine grass area from the front of Keble to the Cherwell, and the High Street ("the High") is one of the stateliest streets in the United Kingdom. Education is the predominant, if not the sole industry at Oxford. Some printing is carried on and the city is an important distributing centre. Pop. (1901), 49,413.

Oxford Clay, a rock belonging to the Middle Oolite or lower part of the Upper Jurassic. Generally it is dark blue; contains some lime, much pyrites and selenite, and many septaria; is from 300 to 600 feet thick, and extends across England from Weymouth, through Blackmoor Vale, to Chippenham, Oxford, Huntingdonshire, and

under the Fens to Hackness and Scarborough. It was also found in the sub-Walden boring near Battle, in Sussex, from 950 to nearly 2,000 feet below the surface. It is often worked for brick-making. Besides ichthyosaurs and plesiosaurs, the most characteristic fossils are the bivalves *Gryphæa dilatata* and *Trigonia clavellata*, and the cephalopods *Belemnites hastatus* and *Ammonites Elizabethæ*.

Oxfordshire, a southern Midland county of England, having Northamptonshire and Warwickshire on the N., Gloucestershire on the W., Berkshire, from which it is divided by the Thames, on the S., and Buckinghamshire on the E. It has an area of 755 square miles, the greater part of which is arable, pasture, or meadow. The chief rivers are the Isis (by which name the upper part of the Thames is known in the county), Thame, Evenlode, Cherwell, and Windrush. In the south are hills and dales, the Chiltern Hills with their woods and downs being among them, and the shire generally is well-wooded. The sloping land in the west is very fertile, the principal crops being wheat, barley, oats and turnips, and the dairy produce is very considerable. There are few manufactures, though Witney produces blankets, Woodstock gloves, Chipping Norton tweeds, and Banbury velvet. Flint and stone implements and mounds of prehistoric man have been discovered in the shire, and amongst Roman remains Icknield Street and Akenman Street are the most interesting. Till the victory of the West Saxons at Burford in 752 the area belonged to the kingdom of Mercia, but it was then incorporated with Wessex. Afterwards its main incidents historically were associated with the city of Oxford, but the county saw some of the fighting in the Civil War, John Hampden having been slain in the skirmish at Chalgrove (1643), while Cromwell defeated the Cavaliers at Islip (1644-5). Pop. (1901), 182,768.

Oxford University. This is a corporate society numbering upwards of 14,000 members. Its foundation was formerly attributed to King Alfred; but its origin is now assigned to the growth in the flourishing and centrally-situated market-town of Oxford of a kind of guild formed by teachers and pupils, who were patronised by the monks of St. Frideswyde's, and by Henry I., who built Beaumont Palace in 1130. Eminent teachers, such as Thibaut d'Estampes, are known to have lectured there about 1120-30; and by 1187 the Masters of Oxford, who were mainly secular clerks, were organised in Faculties, and probably imitated such places of higher education or general studies as Bologna and Paris, to describe which the term University (corporation aggregate) was soon appropriated. The licence to teach which was granted by the acting full-members or Regent Masters to the Undergraduates (who, after a preliminary apprenticeship to study, were called, like the aspirants to knighthood, Bachelors) was the Degree; this was, and is still, conferred after a period of residence and prescribed and tested study in Arts (originally Logic, preceded by Latin, and followed by the Seven Arts of Grammar, Dialectic, Rhetoric,

Music, Arithmetic, Geometry, and Astronomy, and the Three Philosophies of Physics, Metaphysics, and Ethics) and, usually after the Arts Course, in Law, Divinity, and Medicine: the degrees in the last three are those of the Bachelor (B.C.L., B.D., B.M.) and Doctor (D.C.L., D.D., D.M.); so also in the later faculty of Music (B.Mus., D.Mus.), for which residence is not required. The degrees of M.A., D.C.L., and D.D. are also conferred *honoris causa*. The first Oxford M.A. whose name is recorded was the canonised Archbishop of Canterbury, Edmund Rich. The granting of degrees and the processes subsidiary thereto, teaching and examining, still form the most important function of the University. Undergraduates and graduates of various classes are distinguished by difference of the academical gown, the latter by varieties of hood also.

To protect the scholars and promote the continuity of the society various privileges were granted by royal charters and papal bulls. The commissary of their diocesan, the Bishop of Lincoln, soon acquired an independent ecclesiastical authority under the title of Chancellor, Henry III., Edward III., and other kings forced the citizens of Oxford not only to abstain from fleeing and molesting the students, but also, by way of compensation for outrages, to surrender the control of the market and much of the civil government of the city. Royal interference also pacified internal feuds, which, as at the secession to Stamford, nearly produced disruption. The great intellectual progress made in the 13th century was due mainly to the settlement of the Friars (1221-24). The lectures of Bishop Grosseteste, of Adam Marsh, Duns Scotus, and Ockham (Franciscans), and of Holcot and Bradwardine (Dominicans), gave Oxford so great a reputation in Europe that in the 14th century its influence surpassed that of Paris. The names of Roger Bacon, Wyclif, and Peacock illustrate other intellectual developments. (See H. C. Maxwell-Lyte's *History of the University of Oxford*, and Professor T. E. Holland's article in *Oxford Historical Society's Collectanea* II.)

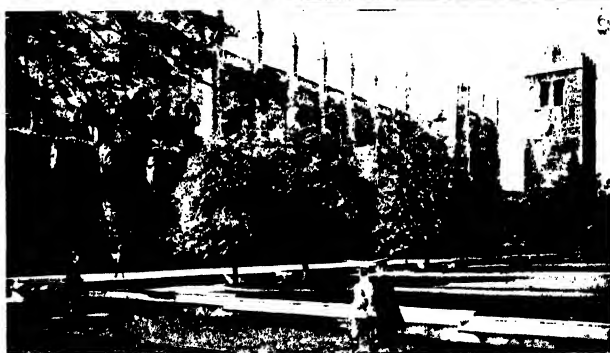
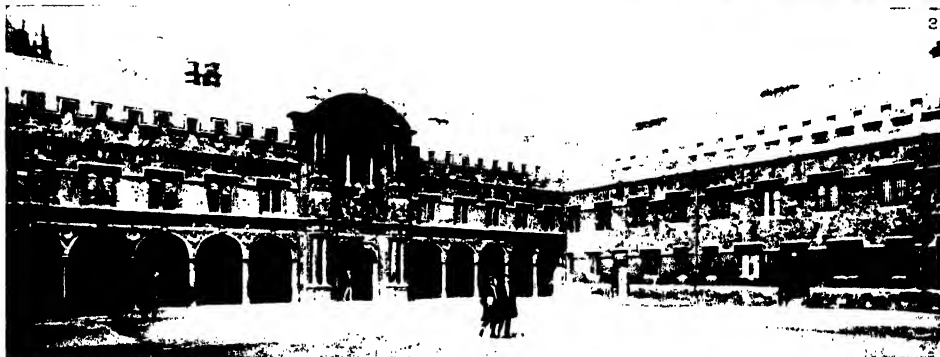
Oxford had begun to take an interest in the New Learning under Grocyn, Linacre, Colet, and Erasmus, when its prosperity was checked by the violent changes which accompanied the Reformation movement. Oxford men were among the earliest adherents of the new tendencies, as in the later revivals by the Nonconformists (the early Quakers, the Wesleys, and Whitefield), and the Tractarians (Keble, Pusey, Newman). But the University, with most of the Colleges, survived, and in 1570 received from Parliament a full confirmation of all its privileges as conferred by Royal Letters Patent, with a formal incorporation under the style of The Chancellor, Masters and Scholars of the University of Oxford. The statutes made by the Masters for internal self-government were reduced to order by special delegates in the Chancellorship of Archbishop Laud (1636), and this code is the basis of the present statute-book as regards status and discipline. The 17th century was a period of progress, seriously

interrupted by the siege of Oxford (1643) and the general confusion of the Civil War; the 18th one of stagnation in education; but the Royal Society was founded at Oxford c. 1650, and many learned men, such as Butler, Johnson, Gibbon, Warton, Adam Smith, were produced (1700-1800), as well as statesmen and lawyers. The revival of educational activity in the 19th century gave rise to an examination system and more efficient methods of discipline and instruction; while the abolition of religious tests in 1871 (except for degrees in Divinity) threw membership open to all persons who could satisfy the proper authorities of their good character and intellectual competence and pay a small annual fee known as dues. These voluntary subscriptions, together with the entrance fees for examinations, degree fees, and the contributions of Colleges to the University Chest, constitute almost the whole revenue of the University itself apart from the endowments in land and stock which it holds in trust for special institutions or branches of learning.

The constitution of the University as reformed by the first Parliamentary Commission of 1851 and further modified by the second of 1877 is as follows. All Masters of Arts, and Graduates in the Superior Faculties of Law, Medicine, and Theology, who have kept their names on the register by payment of £1 per annum, are members of Convocation, which from time immemorial has given the sole or final sanction to all financial proposals, decrees, or statutes; it also elects the two burgesses assigned to the University in 1604, and confers the honorary degrees. All members of Convocation who reside within a mile and a half of Carfax, the centre of the city, constitute Congregation, a legislative body which deliberates and amends, but has no initiative. The Ancient (*i.e.*, unreformed) House of Congregation, consisting of junior Masters of Arts (necessary regents and regents *ad placitum*), heads and deans of Colleges, professors, examiners, etc., retains the power to grant degrees and confirm the appointment of examiners. The initiative for all proposals is vested in the Hebdomadal Council, instituted as an administrative board of the Heads of Houses in 1631, and in 1854 reconstituted to consist of the Chancellor, Vice-Chancellor, and the two Proctors, with eighteen members elected in equal numbers by Congregation from Heads of Houses, Professors, and Graduates generally. The chief official is the Chancellor, usually a peer, whose duties are formal. The Vice-Chancellor, nominated by him for four years from among the Heads of Houses in rotation, four Pro-Vice-Chancellors, and the two Proctors (who, as disciplinary officers, are assisted by four Pro-Proctors), elected annually by the Colleges according to a cycle, are charged with the maintenance of discipline, the general superintendence of studies, assemblies, and committees, and the exercise of such patronage as is not left to election. The High Steward has cognisance in serious criminal cases, and the Chancellor's Court, under the presidency of the Vice-Chancellor or his Assessor, exercises a Petty Sessional or County Court jurisdiction. There is a Public Orator, a

Keeper of the Archives, a Registrar, and two Clerks of the Market. Bodley's Librarian (with two Sub-Librarians) has charge of the University Library, refounded by Sir Thomas Bodley in 1602. It contains over 30,000 MSS., half a million of printed books, numerous portraits, and other treasures, has the right to a free copy of every work published in the kingdom, and has annexed the Radcliffe Library and the whole of the quadrangle of the Old Schools. Other University institutions, such as the Ashmolean Museum (curiosities and objects of art), the University and Pitt-Rivers Museums (laboratories and scientific collections), the Observatories, the Botanic Garden, the Indian Institute, the Hope Collections (entomology and engraved portraits), the Park, the Schools (for examinations), the Taylor Institution (foreign literature), the University Galleries (sculpture and paintings), are guarded by Keepers, under the supervision of Boards of Delegates, Visitors, or Curators, appointed in various ways by the University. The University owns, or holds as trustee, the buildings connected with these bodies, as well as meeting-places for secular purposes (Convocation House, Sheldonian Theatre, Clarendon Building, and Divinity School), has partial control over the University Church of St. Mary the Virgin, and possesses also the Clarendon Press, the largest printing establishment in the country for Bibles and learned works. The University and Colleges are represented on the Council of the City of Oxford and the Oxford Incorporation of Poor Law Guardians. Under a confirmatory Act of George IV. the proctors and their servants, the marshals, exercise an exceptional police jurisdiction in the city. The University has its own coroners, counsel, and solicitor, and servants known as the bedels, bellman, and verger. Select Preachers are appointed for those University Sermons which are not assigned to University or College authorities or Graduates in seniority. Ecclesiastical patronage in the actual possession of Roman Catholics lapses under the Acts 3 James I. c. 5, and 1 William and Mary c. 26, to the Universities. Oxford electing to livings in southern, Cambridge to those in northern counties of England.

The University teaching, originally given partly by private enterprise and partly by the candidates for degrees in the form of the disputations and lectures required at Determination and Inception, is now furnished by professors and readers, endowed by special benefactors or (since 1854) from the revenues of various Colleges. In the faculty of Theology there are seven professors and one lecturer; in Law four professors and one reader; in Medicine and Natural Science, including Mathematics, twenty-six professors and twelve lecturers, readers or demonstrators; in Arts, including languages and history, ancient and modern, and art and music, twenty-five professors and thirty readers, lecturers or teachers. The Theology, Law, and Science professors are well organised, and supply much of the formal teaching required for the University curriculum, the informal instruction being given by College tutors and lecturers; but the systematic instruction in



OXFORD UNIVERSITY.

- (1) QUADRANGLE OF ORIEL COLLEGE.
- (2) GREAT TOM TOWER, CHRIST CHURCH COLLEGE.
- (3) LAUD'S TRIANGLE, ST. JOHN'S COLLEGE.

- (4) MAGDALEN COLLEGE.
- (5) MERTON COLLEGE.
- (6) NEW COLLEGE.

Photos: 1, 3, 4, 5, 6, Cassell & Co.; 2, Gilman & Co., Oxford.

languages, literature, and history is almost entirely left to the Colleges, and the professors lecture to empty benches or ladies. (For details see the *University Calendar and Historical Register*.)

The University now admits its junior members (who are enrolled by a ceremony called matriculation) to the degree of Bachelor of Arts only after a series of examinations. In these there are, roughly speaking, three stages: (1) Responses or "Smalls" demands an elementary knowledge of Greek, Latin, and Mathematics; it is imposed on all actual or would-be undergraduates unless they can produce an equivalent certificate recognised by the University, such as that of the Oxford and Cambridge Schools Examination Board; (2) the First Public Examination ("Moderations" or "Mods") differs for candidates for an Honour or for a Pass career. The latter are examined in Classics and Logic, and proceed to (3) the Second Public Examination, either in Pass Schools (three examinations in various subjects) or, if they change their minds, can take one of the Final Honour Schools ("Greats") of Classics (including Ancient History and Philosophy), Mathematics, Natural Science, Law, Modern History, Theology, and Oriental Languages. The Honour man can enter for either Classical or Mathematical "Moderations," or he can take a Preliminary Examination in law or science, and then proceed in either case to any of the Final Honour Schools; but if he wishes to become a Passman after having done a "preliminary," his course is more complicated. Honour Schools must be taken with certain limits of standing, Pass Schools at any time. In all Honour Examinations the names are arranged in Classes. Other rules may be traced in the *Examination Statutes* or found with explanations in the *Student's Handbook to Oxford*, both published by the Clarendon Press. An examination in a small amount of Scripture (or an alternative) has to be passed before a candidate can enter for a final school. Besides these tests of capacity, the University demands residence (not necessarily continuous) for three academical years, each of which contains two long terms (Michaelmas and Hilary) and two short terms (Easter and Trinity), and consists of 126 days at least. The Christmas and Easter Vacations are short; that in the summer is called the Long Vacation.

The M.A. degree is granted to those B.A.s whose names have been on the books for seven years from matriculation. There are examinations for the first degrees in Law, Medicine, and Music: for the higher degrees in these, and for both degrees in Divinity, theses and exercises, more or less real, are required, together with various conditions as to standing. The system is directed by Boards of Faculties, Boards of Studies and for the Supervision of University Examinations, and Committees for the Nomination of Examiners, the members of which are nominated, elected, co-opted, or *ex officio*. The number of undergraduates averages 3,500 a year. A large number of University Prizes and Scholarships and a few Fellowships are awarded for proficiency in various subjects, mainly after examination or for exercises, to members of the

University without limitation except as to standing. Special conditions were attached to the Scholarships, 78 in number (one-third allotted annually), founded by the will of Cecil John Rhodes (d. 1902). They are of the yearly value of £300 and are tenable for three years at any College in Oxford by students from the Cape, Australasia, Canada, Newfoundland and the British West Indies. They were founded with a view to foster the imperial instinct and maintain the unity of the British Empire. Under the same will were founded American Scholarships (two to each State and Territory) for the purpose of promoting attachment on the part of the holders to the land of their birth, and also several German Scholarships (holders to be nominated by the Kaiser) to bring about a right feeling between Great Britain, Germany and the United States.

Further regulations with regard to residence and studies are imposed by the Colleges and Halls, to one of which, since the time of Laud, all students are required to belong. The Non-Collegiate students (1868) are nominally members of the University only, but they are practically under collegiate rules as fully as are those who are allowed by their Colleges to reside in lodgings licensed by the University Controller. In the earliest times, most students associated voluntarily under a Principal in small societies called Halls, with common meals and joint funds. In 1274 Walter de Merton founded the first College as an adaptation to the needs of University life of the conventual system, and the Rule of Merton was soon followed both by the great Benedictine abbey who built houses for their student-monks, and by bishops and others who wished to provide orderly seminaries for the benefit of particular classes of the community or for the encouragement of special lines of study. Each College was incorporated under statutes sanctioned by the Crown, with endowments held in mortmain for the maintenance of a head and of a definite number of students, soon distinguished according to seniority as Fellows and Scholars. The Colleges provided for these inmates, not only all the necessities of life, but also tuition and occupation, with a small stipend, which increased with the value of the lands with which they were endowed. They have elective officers for discipline (vice-gerents or deans), finance (bursars), education (tutors and lecturers), and for other purposes. The selection of new members was by co-optation, subject to numerous restrictions as to place of birth, etc.; and the fellowship or scholarship was vacated by marriage, failure to take orders, acquisition of property, and in many other ways. In 1855 and 1882 the statutes of the Colleges were entirely remodelled by Parliamentary Commissions. Each College is now provided with a headship, official fellowships, held for terms of years on condition of the performance of certain duties; non-official fellowships, for seven years without duties; scholarships for undergraduates, awarded with an age-limitation, and exhibitions given to the necessitous without regard to age, both after examination. Many scholarships belong to various schools. In most Colleges the majority of the undergraduates

are the commoners, originally elder students allowed to rent spare rooms and pay for a place at the common table, but now young men educated at their own expense. The net corporate revenues are devoted to the endowment of learning within the Colleges or to the support of various University teachers or institutions; and the bulk of the undergraduate's Bateaux, or terminal payments to the College, is for value received in food, lodging, service, or tuition for University examinations. The terms of admission to Colleges vary according to their size and popularity. The following is a list of the existing Colleges, with dates of foundation. In most Colleges the head is elected for life by the fellows and forms with them the governing body. Each College has a visitor to whom to refer in cases of uncertainty. University College, founded by William of Durham in 1249, and Balliol, by John de Balliol and his wife Devorguilla between 1263 and 1268, as Exhibition Funds were converted into Colleges by their trustees after the foundation of Merton by Walter de Merton in 1264-74; Exeter was founded by Bishop Stapeldon of Exeter, 1314; Oriel, by Adam de Brome, 1326; Queen's, by Robert Eglesfield, 1340; New College, by William of Wykeham, Bishop of Winchester, 1379; Lincoln, by Bishop Fleming of Lincoln, 1427; All Souls', by Archbishop Chichele, 1437; St. Mary Magdalen, by Bishop Waynflete of Winchester, 1458; Brasenose, by Bishop Smith of Lincoln and Sir R. Sutton, 1509; Corpus Christi, by Bishop Foxe of Winchester, 1516; Christ Church (including Cathedral establishment of Dean and Canons), by Cardinal Wolsey in 1526 and Henry VIII. in 1546; Trinity, by Sir T. Pope, 1554; St. John's, by Sir T. White, 1555; Jesus, by Queen Elizabeth, 1571; Wadham, by Nicholas and Dorothy Wadham, 1612; Pembroke, by T. Tesdale and R. Wightwick, 1624; Worcester, by Sir T. Cooke, 1714; Hertford (refounded), by T. C. Baring, 1874. Keble, founded in memory of Rev. J. Keble (1870), is on a different footing. The only Hall which survives is St. Edmund Hall (c. 1226). St. Mary Hall, founded in 1326 by Edward II., was re-united with Oriel College, in which its property, site and buildings are vested, in 1902. There are also three Private Halls for the reception of academical students: the Head has the title of Licensed Master (under the Hebdomadal Council) and makes provision for the due governance of the students under his charge. The Head is called Master at University, Balliol, and Pembroke; Warden at Merton, New, All Souls', Wadham, and Keble; Rector at Exeter and Lincoln; Provost at Oriel, Queen's, and Worcester; President at Magdalen, Corpus, Trinity, and St. John's; Principal at Brasenose, Jesus, and Hertford; and Dean at Christ Church, where the fellows are known as students. At Merton the scholars are called postmasters and at Magdalen demies. Very few Colleges maintain their full number of fellows and scholars, owing to continued agricultural depression and consequent loss of revenue. Only a small proportion of the fellows need now be unmarried or in holy orders.

Colleges were originally provided by their

founders with suitable buildings, including chapel, hall, kitchen and offices, library, and chambers (rooms). Most of these have been wholly or partially rebuilt at the expense of the societies, individual members, or new benefactors. The most characteristic in plan and design are those of the great architect Wykeham at New College, which are imitated more or less closely at All Souls', Magdalen, St. John's, Wadham, Oriel, University, Queen's, etc. The best modern works on College history and antiquities are *The Colleges of Oxford*, edited by the Rev. A. Clark (Methuen, 1891), Dr. Ingram's *Memorials of Oxford*, and Messrs. Parker's *Handbook for Oxford*. Information as to the life and studies is given in the semi-official publications already mentioned, and in Mr. J. Wells's *Oxford and Oxford Life*.

Besides its regular functions, the University also supervises by delegates work done mainly by resident masters, in the examination and inspection of schools, in local examinations, in the instruction of Indian Civil Service candidates, in the training of teachers, and in the extension of University teaching in local centres. Female students resident at Halls in Oxford (Somerville, Lady Margaret, and St. Hugh's) and elsewhere are admitted to most lectures and examinations. The University appoints members of the governing bodies of many schools and educational institutions. The privileges of affiliation have been granted to St. David's College, Lampeter; University College, Nottingham; Firth College, Sheffield; Reading College, Reading; Hartley College, Southampton; and similar advantages have been conceded to the Universities of Sydney, the Cape, Calcutta, the Punjab, Bombay and Adelaide. In this connection, though they are not in any way associated with the University and only find a habitation in Oxford, it will be useful to mention that Wycliffe Hall and St. Stephen's House are Theological Colleges of the Church of England; Mansfield College is maintained by the Congregationalist body, and Manchester College was established for the study of theology apart altogether from creed.

Oxides. The term *oxyde* was first introduced by the great French chemist Lavoisier to indicate compounds which consisted of oxygen united to some other element. With the exception of fluorine, all elements form oxides, which differ greatly in their physical and chemical characteristics. Many elements also form more than one oxide, and the different compounds with the same element are distinguished by prefixes—as *monoxide*, *dioxide*, *suboxide*, etc. Some of these compounds are gaseous, as the oxides of carbon, and sulphur-dioxide; some are liquid—e.g., water—but by far the greatest number are solid bodies. Many of the oxides of the metals occur naturally and form important ores, as the oxides of iron, or of manganese. Some of the oxides are soluble and may give rise either to acid or alkaline solutions. Thus oxides of chromium and of sulphur form powerful bases; those of potassium and sodium are strongly alkaline. Many of the insoluble oxides dissolve in acids to form

salts, the oxides being termed basic oxides; others dissolve in and neutralise alkalies, and so play the part of acid oxides. Some oxides, as alumina, can act either as an acid or as a base, forming aluminium salts and aluminates. All acts of combustion, either rapid or slow, which take place in air or in oxygen, consist of the union of the burning substance with the oxygen of the air and the formation of a corresponding oxide. [OXYGEN, COMBUSTION.]

Oxlip (*Primula elatior*), a spring flower, in some respects intermediate between the primrose and the cowslip, but confined (in England) to the north-eastern corner of Essex and parts of the adjacent counties. On the Continent it is more general. It grows in woods, its leaves resembling those of the cowslip, its inflorescence stalked as in that species, the corolla of a pale yellow, concave but larger than the cowslip, and smelling of apricots, and the calyx hairy. The name is often erroneously applied to primroses that are "caulescent"—i.e., have an elongated peduncle, often resulting from hybridisation between primrose and cowslip.

Oxus, or AMU-DARYA (the Persian JIHUN), a river of Central Asia. It rises in the Pamir tableland in two headstreams, the Ab-i-Panja, or Ab-i-Wakhan, originating in Lake Victoria at a height of 13,980 feet above the sea, and the Marghab, or Aksu from Lake Chakmaktin, 13,850 feet above the sea. After the streams unite at Wamar (6,580 feet), the Oxus flows mainly westwards as far as Khamiab, where it bends towards the north-west, ending its run in the Sea of Aral, which it enters by several mouths. Though it receives many affluents in its upper reaches until it has left Badakshan, its lower course is through the barren, sandy tracts of Bokhara and Khiva, where, for irrigation purposes, it is simply invaluable. Its total length is variously estimated at from 1,230 to 1,500 miles. The river has been ascended by steamers for nearly 300 miles from its mouth, and is navigable by small boats nearly throughout its course. It was supposed that it flowed, in prehistoric times, into the Caspian farther west, but recent researches discredit this theory. As far as Khamiab the Upper Oxus forms the boundary between Afghanistan and Russia, and at Char-jui, 150 miles below Khamiab, it is crossed by the Transcaspian Railway.

Oxy Compounds are a class of compounds which contain oxygen in addition to other elements, as oxy-chlorides, etc. In organic chemistry the term *oxy* is frequently used instead of *hydroxy* to designate compounds in which an atom of hydrogen has been replaced by the hydroxyl group, HO; e.g., the *oxy* acids of general formula, $C_n H_{2n} (OH) \cdot CO_2 H$.

Oxygen. Of all the elements which exist in the accessible portions of our earth oxygen is present in the greatest quantity, forming over one-half the weight of the terrestrial crust. It is also the most widely-diffused element, entering into the composition of almost all the commonly occurring rocks and minerals, usually combined with silicon to form silica or silicates. It forms eight-ninths of the weight of water, and over one-fifth of

the volume of the atmosphere, in which latter it exists in the free state. It further enters into the composition of vegetation and of animal life. It is a gaseous element, and was discovered almost simultaneously, and quite independently, by the English chemist Priestley and the Swedish chemist Scheele in 1774. The atomic weight of the element is 16, later experiments giving a slightly lower value, and its density therefore is a little greater than that of air. A small quantity may be conveniently prepared by the method in which Priestley discovered it, i.e., by heating red oxide of mercury, which at a high temperature decomposes into metallic mercury and oxygen:—



It is, however, better prepared by heating a mixture of potassium chloride and manganese dioxide, or by strongly heating the latter compound alone in an iron retort. Large quantities are now prepared and sold, charged at high pressures in iron and steel cylinders, and are employed extensively for use in limelight manipulations. A great advance in its preparation was the introduction of Brin's process, depending on the fact that barium-peroxide when heated first absorbs oxygen and afterwards, on cooling again, evolves the gas. The most noticeable property of oxygen is the manner in which it supports combustion. All substances which burn in air burn with highly-increased brilliancy in this gas. In all cases the act of burning consists in the union of the oxygen with the combustible material, and the formation of oxides. A mixed jet of oxygen and hydrogen burns with the production of an intense heat, and is used for the limelight, water being formed by the union of the two gases. It also plays a most important part in the human and animal economy, and during respiration quantities of oxygen are absorbed into the blood changing its character from venous to arterial. A certain degree of pressure is necessary for this process to take place, and the want of it appears to be one of two factors in the phenomenon known as "mountain sickness." The oxygen so taken into the body is afterwards used to oxidise the tissues of the body, and is evolved chiefly in the form of carbonic acid and of water from the lungs, skin, and kidneys. The energy of living animals is derived from the heat liberated during such slow oxidation. Plants, however, in their chlorophyll portions possess the power under the influence of sunlight of liberating the oxygen from carbonic acid, with a consequent assimilation of the carbon. It is slightly soluble in water, a most important quality, as the life of fishes, like that of other animals, is dependent upon an adequate supply of oxygen, and they derive this supply from the gas which is contained dissolved in the water. It was first liquefied by Raoul Pictet of Geneva, in 1877. By a series of beautiful experiments of Sir James Dewar oxygen and air have been liquefied and even solidified at a very low temperature. Oxygen in this state is a blue liquid, which is attracted by a magnet, and in which alcohol and carbonic acid, etc., immediately solidify.

Oxyhydrogen Light. [LIMELIGHT.]

Oyama, MARQUIS, field-marshal, was born in 1839 (?) at Kagoshima, in the province of Satsuma, Japan. Entering the army he was present, as military *attaché* to the French, at several of the battles of the Franco-German campaign. On his return to his native country he was promoted major-general (1871). He bore an active part in suppressing the Satsuma rebellion in 1877, and in 1879 became Under Secretary for Home Affairs and Prefect of Police at Tokyo and, in 1880, Minister of War. Four years later he was created Count, was made general in 1891, and during the war with China (1894-5) commanded the Second Army Corps, capturing Kinchow, Talienwan, Port Arthur and Wei-hai-wei. For these services he was advanced to the Marquisate and, in 1898, was promoted field-marshal. As chief of the General Staff he directed operations in Manchuria in the Russo-Japanese War (1904-5), inflicting severe defeats on the Russians at Liao-Yung, Shaho and Mukden.

Oyster, the name of the molluscs belonging to the genus *Ostrea*, and the type of the family *Ostreidae*, which belongs to the sub-class *Monomya*, as it only has one abductor muscle for the closing of



SHELL OF THE OYSTER.

the shell. The animal is enclosed in a bivalued shell, of which one valve is flat or concave and free, and the other thickened and convex. The latter is that by which the animal is attached, and was considered to be the left valve; later study of the development, however, has shown that it is the right valve. The oyster is somewhat abnormal, as the heart is really four- instead of three-chambered, and the common species (*Ostrea edulis*) is alternately male and female. The nephridia or kidneys, moreover, consist of long blind tubes, instead of being compact as in most Lamellibranchs. Oysters are all marine, and usually live in shallow water; they are, however, often met with in brackish water, but are then small and ill-developed. They are usually gregarious, but are delicate, and are readily killed by frost, and by fresh or impure water. They have numerous enemies, the spat being eaten by small

fish, and adults by starfish, while a boring sponge (*Clione*) often riddles and ruins the shell. The oysters spawn in May and June. The spat is often collected and allowed to develop in shallow tanks, and these oysters are then known as "natives"; such rearing-grounds are usually in estuaries as at Whitstable on the Kentish coast, Brightlingsea on the estuary of the Colne, and Burnham on the Crouch. Arcachon and Cancale are the chief sources of the French supply. The oyster is not mature for from four to five years, and may live for several years longer. *Ostrea edulis* is the common English species, but other species are eaten elsewhere.

Oyster-Catcher, a bird of the genus *Hæmatopus*, of the family *Charadriidae* (Plovers), with nine species, universally distributed. The Common Oyster-catcher of Europe (*H. ostralegus*) ranges as far north as Greenland and south to central Africa. The adult male is about sixteen inches long; its black-and-white plumage (whence it is called *Sea-Pie*) contrasts well with the orange feet and red bill. In Great Britain the favourite habitat is the east coast. The name Oyster-catcher conveys a wrong impression, for the chief food of these birds consists of mussels, crustaceans, worms, and small fishes.

Ozena, the term applied to the intensely offensive discharge which is associated with some forms of disease of the nose. Ozena occurs in ulceration of the nasal mucous membrane, catarrh of the nasal bones, and in a peculiar kind of chronic inflammation which sometimes affects the lining membrane of the nose. The local treatment is by washes and powders, the general by tonics.

Ozokerite, or MINERAL WAX, is widely distributed in Rumania and Galicia, and consists of a mixture of a number of hydrocarbons of the paraffin series. [PARAFFIN.] If purified, it is used as a substitute for beeswax and is known by the name of Ceresine.

Ozone is a modification, or allotropic form of oxygen, which was discovered in 1840. It is composed solely of oxygen, although its properties are markedly different. The difference is explained by the assumption that in ozone three atoms of oxygen are united to form a single molecule, whereas in oxygen itself the molecule consists of but two atoms. That three volumes of oxygen form two volumes of ozone was shown by the experiments of Andrews and of Sorel. It is formed during a silent electric discharge through oxygen, and is produced in small quantities during electrolysis, and most slow oxidations, *e.g.*, of phosphorus. It possesses a powerful penetrating odour, and acts as a more effectual oxidiser than oxygen, acting on many substances unaffected by the latter element. At low temperatures it may be condensed to a blue liquid. It is present to a slight extent in the atmosphere near the sea and in the open country, but in the neighbourhood of towns it is absent, being used up in destroying the organic material in the air.

P

P, p, the fifteenth letter of the Latin and the sixteenth of the English alphabet the hard labial voiceless stop or explosive consonant formerly called the hard labial mute. The character is derived from the Phœnician *pi*, through the Greek π ι, Π, π. Though common in English, it is seldom found in words of Anglo-Saxon origin. Before *m*, as in *topmast*, the *p* sound is produced, not by opening the lips, but by lowering the *velum pendulum* and so letting breath pass through the nose. In some words of Greek origin *p* is mute before *n* and *s*, as in *pneumatic*, *psalm*.

Paardeberg Drift, on the Modder, Orange River Colony, South Africa. The spot was rendered memorable as the scene of the surrender of General Cronje and his force on February 27th, 1900. This event changed the character of the Boer War, which thenceforward partook more of the nature of guerilla warfare.

Paca, an animal of the rodent genus *Cælogenys*, with a single species (*C. paca*), ranging from Guatemala to Paraguay, South America. With the Agoutis the Pacas constitute the family *Dasyproctidæ*. These animals are about two feet long, stoutly-built, yellowish-brown above and whitish below, with from three to five longitudinal bands of white spots on each side.



PACA.

They run fast and swim well, are partially nocturnal in habit, and generally burrow near water. Their diet is exclusively vegetable and they do considerable damage in gardens and sugar plantations. The flesh is esteemed a delicacy.

Pachydermata, Cuvier's name (now lapsed) for the thick-skinned, non-ruminating Ungulates.

Pacific Ocean, THE, is the name given by Magellan, in 1520, to the vast expanse of waters which divides America from Asia. It measures 9,000 miles from south to north, whilst its breadth varies from 40 miles at Bering Strait to 10,000 miles between Quito and the Moluccas. The area may be reckoned at about 68,000,000 square miles. It is thus the largest of the oceans and occupies half of the water surface of the globe, and one-third of the total area of the world. Its depth is greater than that of any other ocean, averaging 2,500 fathoms. The *Challenger* (British) sounded 4,575 fathoms between the Caroline and Ladrone Islands, the *Tuscarora* (United States) 4,655 fathoms off the Kurile Islands and the coast of Japan. and

a British surveying ship 4,530 fathoms east of the Fijis, the deepest sounding south of the equator. The surface is affected by the equatorial current sweeping across the entire breadth from east to west and branching off southwards to the Polynesian Archipelago and Australia and northwards to Japan and Kamchatka, and by the southern Pacific counter-current flowing from Tasmania eastwards and dividing into the Cape Horn and Peruvian currents. The highest temperature of water is found somewhat north of the equator, and the temperature of the southern is lower and more equable than that of the northern portion. As regards prevailing winds, the Pacific differs from the Atlantic in having a narrower equatorial belt of calms, and this affects the course of the trade-winds. Southerly and south-easterly monsoons blow during the summer months, and are reversed in winter, though liable to deflections in the neighbourhood of continents.

Packard, ALPHEUS SPRING, naturalist, was born at Brunswick, Maine, United States, on February 19th, 1839. Having graduated at Bowdoin College, he became assistant to the great naturalist Agassiz, and was employed in various scientific expeditions. From 1871 to 1873 he held the post of State entomologist in Massachusetts, and in 1878 was elected to the chair of natural history in Brown University, Providence, Rhode Island. He was the founder and for many years chief editor of the *American Naturalist*. In addition to many monographs contributed to scientific societies, Professor Packard has written numerous volumes of popular science, amongst them, *The Mammoth Cave* (1872), *Our Common Insects* (1873), *Life History of Animals* (1876), *Injurious Insects of the West* (1877), *Zoology* (1883), *The Glacial Phenomena of Labrador and Maine* (1891), *Textbook of Entomology* (1898), and *Lamarck* (1901).

Pactolus, in ancient geography, a river of Lydia, Asia Minor, identified with the modern Sarabat in Anatolia. It rises in mount Tmolus (modern, Baz Dagh), and joins the Hermus (modern, Gediz-Tchai) about 50 miles east of Smyrna. Among the ancients its name was synonymous with wealth, owing to the gold which its sands contained and which was the storied source of the vast riches of Croesus.

Paderborn, a town of Westphalia, North Germany, 41 miles S. of Minden, at the source of the Pader. Founded by Charlemagne, it was for centuries a free imperial city, and a powerful member of the Hanseatic League. In 1803 it was acquired by Prussia, but Napoleon included it in Westphalia, to which it belonged until the repartition of Germany in 1813. The streets are ancient and narrow, and the fine cathedral, dating from the 12th century, contains the relics of St. Liborius. The town is still the seat of a bishopric and of an important Catholic seminary. The manufactures are of a miscellaneous character but unimportant. There are mineral springs in the vicinity. Pop. (1900), 23,538.

Paderewski, IGNACE JAN, pianist, son of a

gentleman farmer, was born in Podolia, Russian Poland, on November 6th, 1860. As a child of three he began to play the piano and at seven was placed under a local teacher, P. Lowinski, a violinist. In 1872 he went to Warsaw, where he studied harmony and counterpoint under Roguski, and took piano lessons from Janotha. At sixteen he made his first tour through Russia and Rumania, and in 1878 became a teacher at the Warsaw Conservatoire. Paderewski married when he was nineteen, but his wife dying in the following year, in his bereavement he sought for consolation in a more entire devotion to his art and went to Berlin to study composition under Friedrich Kiel. In 1884 he taught in Strasbourg Conservatoire, but resolving to become a *virtuoso* he abandoned teaching and proceeded to Vienna for further study under Theodor Leschetitzky, in 1886. He made his debut in Vienna in 1887, and appeared with phenomenal success in Paris, London (May 9th, 1890), and America. In addition to an opera *Mauru*, Paderewski has composed music for the orchestra and pianoforte. As an exponent, with whom practice and study never cease, his position as the successor of Rubinstein and Liszt is probably undisputed. In 1899 the Baroness de Rosen became his second wife.



IGNACE JAN PADEREWSKI.
(Photo: I. Golcz, Warsaw.)

Padiham, a town of Lancashire, England, 3 miles W.N.W. of Burnley. St. Leonard's Church contains the font which was given to an older church by John Paslew, the seventeenth and last abbot of Whalley, who was hanged on March 12th, 1537, for resisting the King's Commissioners and taking part in the Pilgrimage of Grace. The industries comprise collieries and quarries besides manufactures of cotton and other textiles. Pop. (1901), 12,250.

Padilla, JUAN LOPEZ DE, insurrectionary leader, born at Toledo, Spain, about 1490, rose in the service of Charles V. to be military governor of Saragossa. He joined in the movement against the oppressive misgovernment of the king, and became head of the Junta which set up the ineffectual Joanna as sovereign. In the war of the commons which followed, Padilla gained some success, capturing Torrelabaton and other places. However, in 1521, he was overwhelmed and captured at Villalar. On the day after his defeat he was beheaded (April 24th); but his wife defended

Toledo against the Royal forces for six months after his death, and is associated with him in many Spanish ballads and legends.

Padua (Latin, *Patarium*; Italian, *Padova*), a city of North Italy, situated on the Bacchiglione, 25 miles W. of Venice. In the early days of the Roman republic it was a considerable place; but at the fall of the empire it suffered severely from the Huns, and passed twice from the Gothic kings to the Greek emperors. It went through the various vicissitudes of the towns of North Italy until acquired by Venice in 1403, after which date its history becomes identical with that of Venetia. The University of Padua, founded by Frederick II. in 1238, was throughout the Middle Ages one of the most famous schools of Europe and still retains great vitality. Among the many striking architectural features of the town may be mentioned the Palazzo della Ragione (1172), with a roof of larger span than any in Europe; the Piazza dei Signori; the Palazzo del Capitano; Il Santo, or the basilica of St. Antony, the Augustinian church of the Eremitani, with frescoes by Mantegna; the Capella dell' Arena, decorated by Giotto; and the cathedral, where Petrarch's tomb is seen. The industries include the weaving and dyeing of silks and woollens, brewing, distilling, ink-making, with manufactures of chemicals, candles, agricultural implements and motor-cars, in addition to iron-founding, and corn- and saw-mills. It also does a brisk trade in grain, cattle, wine and oil. Livy, the celebrated Latin historian, and Andrea Mantegna, the painter, were natives. Pop. (1900), 93,560.

Pædogenesis, reproduction by immature animals. It occurs in the larvae of some flies (*e.g.*, *Heteropeza* and *Chironomus*) and, among vertebrates, in the amphibian Axolotl of Mexico and in *Triton alpestris* of Switzerland, and also in some fishes.

Pæstum (Greek, *Posidonia*), a Greek colony on the coast of Lucania, Italy, founded about 600 B.C. by settlers from Sybaris. Its site is now known as Pesto and stands on the shore of the Gulf of Salerno, about 50 miles S.W. of Naples. It speedily rose to great prosperity, and preserved its independence for several centuries, being conquered at last by the Lucanians, and passing in 273 B.C. into the possession of Rome, when it took the name of Pæstum. The Temple of Poseidon is one of the finest monuments of Doric architecture.

Paganini, NICOLÒ, violinist, was born at Genoa, Italy, on February 18th, 1784. At the age of nine he made his first public appearance with complete success, but he passed the next twelve years in study and composition. He then began a series of tours throughout Europe, exciting astonishment everywhere by his wonderful performances, especially on the fourth string alone. It was not, however, until 1831 that he played in Paris and London. The zenith of his fame was reached in 1834, when Berlioz composed for him the well-known symphony

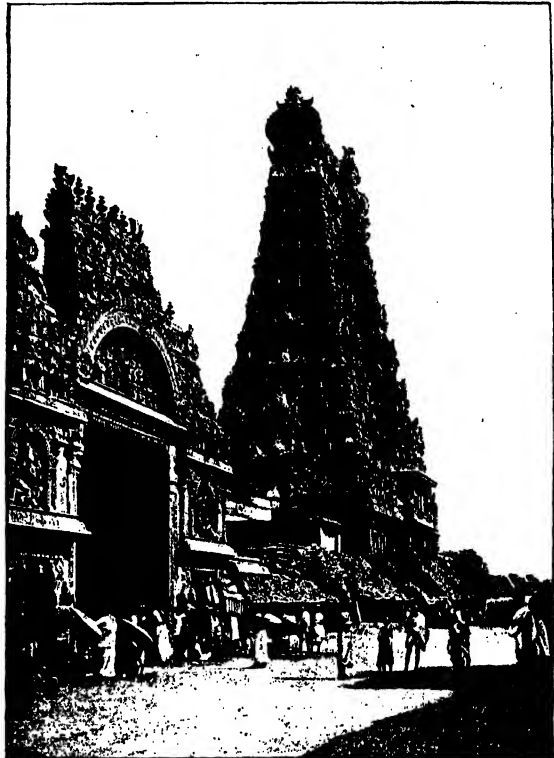
Harold en Italie. His health soon afterwards declined, and he died on May 27th, 1840, at Nice, of laryngeal consumption. It is said that he moved his audience to tears in *cantabile* passages, while in his gymnastic feats a Viennese *virtuoso* declared he had seen the Devil assisting him. But Paganini was a marvellous executant rather than the perfect artist.

Paget, SIR GEORGE EDWARD, physician, was born at Great Yarmouth, Norfolk, on December 22nd, 1809. He went from Charterhouse to Gonville and Caius College, Cambridge, where he graduated as eighth wrangler in 1831, subsequently being elected to a fellowship. He entered St. Bartholomew's, London, and also studied medicine in Paris and Cambridge, where he graduated M.D. in 1838. Almost the whole of his career was spent at Cambridge as a teacher and practitioner. In 1872 he became Regius Professor of Physic, and from 1869 to 1874 he was President of the General Medical Council. He was elected F.R.S. in 1873, was created K.C.B. in 1885, and died at Cambridge on January 16, 1892.

Paget, SIR JAMES, surgeon, brother of the preceding, was born at Great Yarmouth, Norfolk, on January 11th, 1814. He was educated privately and, deciding on a medical career, studied at St. Bartholomew's Hospital, London. In the course of his dissections he discovered that the parasitic worm, *Trichina spiralis*, infested the human subject—a discovery usually attributed to Sir Richard Owen, to whom the example and observations had been sent for confirmation. Paget became a member of the Royal College of Surgeons in 1836 and fellow in 1843, acting as professor of surgery and anatomy from 1847 to 1852, and being elected to the Presidency in 1875. He was for many years on the Senate of the University of London, and was Vice-Chancellor from 1883 to 1885. While yet assistant-surgeon at St. Bartholomew's (1858) he was appointed surgeon-extraordinary to Queen Victoria, attended the Princess of Wales (afterwards Queen Alexandra) during a long surgical illness, was made surgeon to the Prince of Wales (afterwards Edward VII.), and serjeant-surgeon to Queen Victoria in 1877. He was created a baronet in 1871. He was a brilliant teacher and enjoyed one of the greatest surgical practices of his day. He died in London on December 30th, 1899. Besides descriptive catalogues of the pathological specimens in the Royal College of Surgeons' Museum and of the Anatomical Museum at "Bart's," Paget was the author of *Lectures on Surgical Pathology* (1853), *Clinical Lectures and Essays* (1875), and *Studies of Old Case Books* (1891).

• **Pagoda**, in the East, where the Buddhist

religion is professed, a sacred tower built in several storeys, of which the number is always odd. Such towers were originally raised over a relic of Buddha or of a Buddhist saint. They are generally more or less pyramidal, as is the famous Great Pagoda of Tanjore. The most remarkable pagoda ever constructed, however, was that which the Taiping rebels destroyed in Nanking, in China, in 1856. It was begun in 1413, and took nineteen years to build. It was 260 feet high and consisted of nine storeys. The outer walls were cased with white-glazed brick, and the overhanging eaves of each



THE GREAT GOPURAM, MADURAI.

[Photo: Nicholas & Co., Madras.]

storey were formed of green glazed tiles. From the several caves were suspended bells (152 in number) and countless lanterns were displayed at every suitable point. The name is also applied to gold (or, occasionally and less commonly, silver) coins with a pagoda figured on the reverse, current in India from the 16th century, worth about 7s. 1d.

Pagurus, the best-known genus of the Hermit-Crabs.

Pahang, one of the Federated Malay States, occupying a portion of the south-east of the

Peninsula of Malacca, bounded on the N. by the independent states of Kelantan and Trengganu, on the E. by the Chinese Sea, on the S. by Johore and the protected states of Negri Sembilan, and on the W. by the protected states of Perak and Selangor. It occupies an area of 15,000 square miles, being the largest state in the Peninsula. The Pahang, from which it takes its name, is the only considerable river, and is navigable by large boats for 200 miles from its mouth. Gunong Tahan, in the extreme north, is the highest mountain (8,000 feet). The state is covered with forest, but its great wealth consists in its minerals, of which gold is the chief, though lead and tin occur. Dammar, resin, gutta-percha, and timber are the other leading exports. Pahang was under native rule till 1887, when the Rajah entered into treaty with the Governor of the Straits Settlement and received a consular agent at his court. Next year a British Resident was appointed to safeguard British interests and, in consequence of rebellions between 1891 and 1895, the Sultan was induced to join the Federated Malay States by a treaty signed in the latter year, and Pahang is now under British protection though not part of the British Empire. The Sultan resides at Pekan, at the mouth of the Pahang, which was till 1898 the capital. Pop. of state (1901), 84,113.

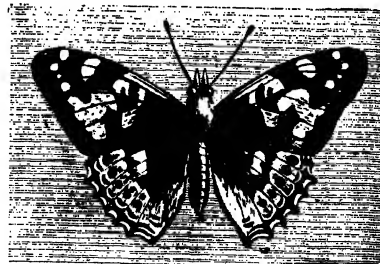
Paine, THOMAS, author, was born at Thetford, Norfolk, on January 29th, 1737. He was educated at the Grammar School, and then put to his father's trade of stay-making. He was, however, of a somewhat volatile disposition, for he also tried the sea, the excise, and shop-keeping. Probably on account of his unsettled life he went to America in 1774. The Independence War broke out next year. Paine's sympathies went with the Colonists, and his pamphlet on *Common Sense* turned them against the Mother Country. He joined Washington's army as a private, and was appointed secretary to the Foreign Committee of the first Congress. Returning to England (1786), he published in 1791 *The Rights of Man* as a reply to Burke's *Reflections*. This brought a prosecution for treason upon Paine, but the Government allowed him to withdraw to France, where he had been elected to the Convention as the representative of the Pas de Calais (1793). His moderation incurred Robespierre's enmity and he narrowly escaped execution. Whilst under confinement he composed the first part of *The Age of Reason*, which had the effect of depriving him of much sympathy. In 1802 he went back to the United States, but wrote nothing of importance in the interval before his death, which took place in New York on July 8th, 1809.

Painted Lady (*Pyranais cardui*), a butterfly widely distributed in England. It is a handsome insect of orange-red colour with black and white spots. It hibernates during winter, being one of the few which live for two summers.

Painter, WILLIAM, translator, born in 1525 (? 1540), is thought to have been a Kentishman, but in the Cambridge University register is described as a native of Middlesex. He matricu-

lated as a sizar at St. John's College, Cambridge, in November, 1554, but left the University without a degree and became headmaster of Sevenoaks School about 1560, being ordained deacon by Bishop Grindal. In 1561 he was made Clerk of the Ordinance in the Tower of London, an office he retained until his death, on February 14th, 1594. His stipend was eightpence a day. By borrowing public funds he grew rich and bought two manors in the parish of Gillingham, Kent. The Government became suspicious and he was ordered to refund £7,075. When charged with the sale of war material he protested against the "slandorous informations." Painter was a great reader and made a collection of stories translated from Latin, Greek, French, and Italian. In 1566 he published the first volume of *The Palace of Pleasure*, "beautified, adorned, and well-furnished, with Pleasant Histories and Excellent Nouells selected out of divers good and commendable Authors," dedicated to his official superior, the Earl of Warwick. A second volume was issued in 1567. This collection is interesting not only because it introduced the Italian novelists Biondello, Boccaccio, and others to English readers but also as being the source whence the Elizabethan dramatists drew many of their plots. *Romeo and Juliet* and others of Shakespeare's plays and poems are derived from Painter's work, which became exceedingly popular, but Ascham denounced the "bawdie stories . . . brought out of Italie" as likely to "marre mens manners."

Painter's Colic (*Colica pictorum*). The continued absorption into the system of minute doses of certain lead salts gives rise to a form of chronic poisoning known as plumbism. One of the most characteristic symptoms is the occurrence of severe attacks of abdominal pain associated with obstinate constipation, and in some cases certain nervous symptoms are also present, the best known of which is the characteristic wrist-drop due to paralysis of the muscles which extend the wrist upon the fore-arm. In rare instances optic atrophy and convulsive seizures occur in connection with lead-poisoning, and plumbism appears to have some connection with gout. A remarkable symptom which is usually present in the subjects of lead-



PAINTED LADY.

poisoning, and which materially facilitates the diagnosis of the condition, is the "lead-line," a



PAINTING.

THE VIRGIN AND CHILD, ATTENDED BY ST. JOHN THE BAPTIST AND ST. NICHOLAS OF BARI.
(From the painting by Raffaello Sanzi in the National Gallery, London.)

blue line which is developed at the margin of the gums at the point of junction with the teeth. Lead-poisoning may originate in many ways. It is sometimes due to the action of drinking-water upon the leaden pipes through which it is conveyed for domestic use. It was at one time common in Devonshire, and was attributed to the use of leaden vessels in the manufacture of cider in that county. The usual cause of the disease nowadays is the manipulation of salts of lead by those who work in places where white-lead is manufactured, and by those engaged in the glazing of pottery and by painters, plumbers, etc. Treatment consists in the removal of the cause where possible, and in the case of those who must continue their employment the most careful attention to cleanliness is imperative. It is said that the use of sulphuric acid lemonade to a great extent protects lead-workers from the malady, and improvement in processes of manufacture has considerably diminished the number of cases of the disease. In the elimination of lead from the system iodide of potassium is of considerable value. Lead colic is treated as a rule by the use of opium and avoidance of strong purgatives. In treatment of wrist-drop electricity is commonly employed.

Painting is that art of design which imitates or interprets objects by colour on a flat surface. In its origin it was not an independent art, but was subservient to sculpture and architecture. The earliest Egyptian painting consisted of the colouring of bas-reliefs, vases, and statues. Long after its dissociation from sculpture, etc., the art continued to be connected with the hard outline, being regarded as an accessory to rather than a substitute for gold or silver ornamentation and linear drawing. It was thus considered in Byzantine art which during the earlier Middle Ages dominated the whole of Europe. Not until the later Renaissance do we find the modern art of painting which, save in purely decorative work, aims at losing outline rather than retaining it.

The earliest painters are supposed to have belonged to Corinth or Sicyon about the year 650 B.C., but it is probable that the art was practised contemporaneously in Egypt, Assyria, and Etruria. These primitive works, on vases, the walls of tombs, etc., mostly consisted of figures of men and animals, though landscape is found in a rude and childish background form. Antique painting reached its golden age during the 5th and 4th centuries B.C. Polygnotus of Thasos, who settled at Athens about 460 B.C., may be said to have founded the Athenian School. Aristotle speaks of him as having been successful in his expression of character, and Pliny refers to his excellent rendering of transparent drapery. Apollodorus of Athens (*circa*. 404 B.C.) is said to have investigated the principles of light and shade. Zeuxis, Parrhasius of Ephesus, and Apelles excelled in the domain of pure illusion. The Romans imported Greek pictures and did their best to imitate them. C. Fabius Pictor (304 B.C.) derived his name from decorating the Temple of Health, and at a later period Areluius, Amulius, and Ludius painted landscapes and

buildings on the walls of rooms. In the age of Hadrian Roman painting underwent a revival.

Methods of antique painting. The Egyptians used a sort of distemper mixed with dissolved gum, and appear to have possessed a fairly copious palette. Their work aimed at being both a record and a decoration. It was of course hampered by want of knowledge of perspective and other technical qualities. In Assyrian painting the figures bear a close likeness to those on modern playing cards; they used the same medium as the Egyptians. Sir Joshua Reynolds believed that the Greeks used four colours only, but a more extensive palette must have been employed by Apelles. Oils and varnishes were known both to them and to the Romans, but they did not apply their knowledge of these to painting.

Oil-colours were introduced by John and Hubert van Eyck, and the practice became firmly established in Europe by A.D. 1500, though it did not gain universal popularity. Michael Angelo despised it. Raphael, while he worked both in oils and fresco, achieved his greatest triumphs in the latter. The first oil-colours were really tempera colours mixed with a drying varnish, and the method of the painters was the same in both mediums: that is, they worked on a panel the surface of which was prepared by two or three coats of size, upon which a layer of coarse gesso was spread, and on this were laid eight coats of finer gesso, the finished surface being scraped smooth. As, however, the possibilities of the new medium unfolded themselves, different painters adopted different expedients for gaining their effects. For instance, the Van Eycks painted upon a transparent monochrome. Titian employed a substantial dead colouring for his ground, and worked on it by successive glazings. Rubens used transparent colours over a first painting in transparent brown monochrome, but instead of leaving the lights thin—like the early Flemings—he loaded his lights with opaque colour. The 17th-century Dutchmen also painted the shadows thinly and the light opaquely, and this is largely the modern practice.

Water-colour has taken the place of fresco in modern painting. The processes of distemper (Italian *tempera*), fresco, and enamel and encaustic painting will be found described under their separate headings.

SCHOOLS OF PAINTING.

Italy is held to be the fountain-head of painting, and the centre of the Renaissance that spread over the whole of Europe in the 15th and 16th centuries. The most famous names in Italian art are those of Giotto (1276-1336), Leonardo da Vinci (1452-1519), Michael Angelo (1475-1563), Raphael (1483-1520) and Correggio (1494-1534); while to Venice belong Giorgione (1478-1511), Titian (1477-1576), and Tintoret (1512-1594). All these will be found described under their separate headings. The Italian School of the Renaissance was divided into many local schools, of which the following are the best known:—

(1). The Tuscan School (more familiar as the Florentine School) may be said to have originated

with Cimabue, and to have received its impetus from Giotto, who was the first to break with the Byzantine traditions of painting. Paolo Uccello (1400-1479), Filippo Lippi (1412-1469), Ghirlandajo (1449-1498), Antonio Pollaiuolo (1426-1498), Fra Angelico (1387-1455), Botticelli (1437-1515), Filippino Lippi, Signorelli, and Andrea del Sarto were members of this school, which exercised a most extensive influence.

(2). The Umbrian School was chiefly connected with the 15th century. The principal names are Piero della Francesca (d. *circa* 1495), and Pietro Perugino (1446-1524).

(3). The Bolognese School produced Francia (d. 1533) and the Caracci and Guido Reni at the end of the 16th century.

(4). The School of Parma and Ferrara is mainly identified with the name of Correggio (1494-1534).

(5). The Paduan School obtained some note under the Squarcioni (early 15th century), whose most famous pupil was Andrea Mantegna (1431-1506).

In addition to these there was the Roman School, the foundation of which is credited to Raphael. The famous painter, however, belongs properly to the Umbrian School, since his master was Perugino, although he worked chiefly in Rome. Thither also were attracted by the munificence of successive Popes other painters from different parts of Italy. Strictly speaking, there was no native school at Rome, and the same may be said of Naples, which, like the capital, was a centre of artistic activity.

The Venetian School.—The art movement in the neighbouring State of Padua during the 15th century gave an impulse to Venetian painting, which formed an illustrious school, and assumed definite and distinctive characteristics in regard to *opulence of colour* in the work of the Brothers Bellini. But the full glory of Venetian art was scarcely reached before the beginning of the next century—the era of Giorgione, Titian, Tintoret, and —so far as style is concerned—Paul Veronese. It should be noted that the pre-eminence of this school at a time when the rest of artistic Italy was beginning to fall into decadence was almost entirely due to the introduction and the perfection of the method of oil-painting by the Van Eycks. The art of fresco never flourished in Venice, the humid climate being antagonistic to its permanence. Moreover, the Venetian affection for deep strong colouring could only gain its full expression in oil-painting, and these two causes acting in combination were responsible for the perfect though late development of Venetian art.

By the end of the 16th century the Renaissance in Italy was entirely over, and art in the hands of the Eclectic painters languished throughout the 17th. Guido Reni, the Caracci, and Salvator Rosa (1615-1673) are almost the only names that are worth remembering in connection with this later epoch. At the beginning of the 19th century, the German "pre-Raphaelites," headed by Overbeck (1789-1869), established themselves in Rome, and constituted a curious attraction for the rest of the art world; but the native school was of no account. Modern Italy has produced no great

name in art with the exception of Giovanni Segantini, the mystic and poet-painter of peasants and Alpine solitudes.

Flemish painting undoubtedly existed during the 13th century, but it is not till the time of Hubert Van Eyck (1366-1426) and his brother and co-worker John (d. 1440) that we find extant record of an advance on the early primitives. Apart from the introduction of oil-painting attributed to the brothers, they executed portraits and religious subjects, naïve in anatomy and materialistic in sentiment, but distinguished by great delicacy of execution. Roger van der Weyden (d. 1364), who followed, travelled much in Italy, and is credited with having introduced the knowledge gained therefrom not only into his own country, but into the adjacent school of Cologne, one of the many German schools that were at this time struggling into existence. But it was not till nearly a century later that Mabuse (1499-1562) and Van Orley (b. *circa* 1490) set the fashion in "Italianised" Flemish art, which exercised so baneful an influence on the national painting—an influence destined to last till the time of Peter Paul Rubens. Meanwhile Hans Memling (d. 1495) had brought a more spiritual element into Flemish painting, and the advent of Quentin Matsys (1466-1530) was the signal for a widening of its scope by the addition of *genre* to religious subjects and portraits. With Rubens (1577-1640) begins a line of brilliant painters, which continues to the end of the 17th century, and includes Van Dyck (1599-1641), Jacob Jordaens (1594-1678), and a host of "little masters" who, to take the younger Teniers (1610-1690) as an example, are so closely allied to the Dutch school as to be hardly distinguishable. The 18th century was, for the Netherlands as elsewhere, a period of decadence, and when, in the 19th, the school emerges as the Belgian School, it is difficult to trace the connection between the old and new. The period 1830-1850 was one of historical painting—romantic, and rather artificial—with Baron Wappers and Baron Leys as its chief exponents within the Antwerp School; that from 1850 to 1870 a time of transition, with a tendency towards realism. To-day the centre of activity has shifted from Antwerp to Brussels, where the Free Society of Fine Arts has done much to encourage open-air painting, with the result that several capable landscapists have arisen, notably Hippolyte Boulenger, Jean Paul Clays, and Louis Artan. Other famous names in modern Belgian art are those of Constantin Meunier, Charles Verlat, Juliaan de Vriendt, Alfred Stevens, Louis Galluis, and Émile Wauters.

The Dutch School enjoyed its best period during the 17th century. Rembrandt van Ryn (1606-1669), the world's master in light and shade and subtle poetic insight, heads the list of Holland's painters, but there are others of scarcely less note—Frans Hals of Haarlem (1584-1666), the laughter of whose nature shines through so many of his canvases, the master pre-eminently of brush-work; Nicholas Mess, a portrait and subject-painter, who at times approached Rembrandt; Ravesteyn and Honthorst, portraitists; Gerard

Dow, Ver Meer of Delft, and Peter de Hooghe, masters of "interiors with figures"; Adrian Brouwer and the Ostades among the inimitable interpreters of peasant life; Jacob Ruysdael and Meindert Hobbema, princes of landscape; William Vandevelde and Backhuysen, who for nearly two centuries gave the lead to English seascape painters; Snyders and Hondcoeter in still life. Modern Holland has produced a fine school of landscape, with James and William Maris pre-eminent, and Théophile de Bock not far behind; Joseph Israëls has devised a variety of subject pictures dealing with humble life, and Albert Neuhuys and others have been content to divide his artistic inheritance; in pastoral themes Anton Mauve (1838-88) stands alone for silvery colour and poetic charm; whilst the delicate fancy of Matthew Maris finds an echo in the younger school of purely decorative artists. H. W. Mesdag remains a giant amongst realistic interpreters of the North Sea.

The German School, like that of Italy, had many subdivisions. As in the latter case, signs of new life in art began to show themselves in the former early in the 13th century. At the close of the 14th the School of Cologne held a paramount position in the art-life of the country. Pictures by Meister Wilhelm, referred to by a chronicler of 1380, were for long treasured in the Church of St. Clara in Cologne, and the great altar-piece in the cathedral was attributed to Meister Stephan of the same city. Other German schools were those of the Middle Rhine, Bohemia, Franconia, Westphalia, Augsburg, and Nuremberg. The development of Germany's art may be divided into three stages: (1) emancipation from the flat, linear representation of objects, to which primitive painting was confined, and the effort towards a more plastic and more realistic method, aiming at the material translation of objects; (2) the stage of the Netherlandish influence introduced by Roger van der Weyden; and (3) the stage of the Italian

influence which swept the country during the early 16th century and culminated in Elsheimer (1578-1620). The principal art centre in mediæval times was Nuremberg. Here Albrecht Dürer (1471-1528) held sway, and it is in the painstaking draughtsmanship of this master, and the intense naturalistic veracity of the not less famous Hans Holbein, the younger (1498-1554), that we find the keynote of German painting.

To-day the art centre has changed from Nurem-

berg to Munich. Cosmopolitan influences have altered the face of German painting. Within the empire itself, in Austria-Hungary, and in Bohemia, there are painters of every artistic creed. But much of the old German spirit of workmanship may be found in the work of Adolf von Menzel, and of German realism in that of Frans von Lenbach, a prince among modern portraitists. Famous Munich "secessionists" are Freiherr von Haberman and Fritz von Uhde; von Bartels stands for strength in water-colour; Max Liebermann was the first to give the *plein air* departure in his country, and his "Flax Cleaning in Laren" is one of the modern treasures in the National Gallery of Berlin. In Austria-Hungary Makart (1840-84) for long dominated Viennese painting



THE "SISTINE MADONNA" BY RAPHAEL.

by the showy splendour both of his colouring and his personal surroundings, and the art of August von Pettenkofen (1821-89) corresponds to that of Menzel in Germany. In 1896 there was a secession from the Viennese Society of Artists (*Künstlergenossenschaft*), led by Theodor von Hermann and the original, sometimes inscrutable, Gustave Klimt. Michael Munkacsy's pictures (d. 1899) are typical of the spectacular side of Hungarian art. In Bohemia the spectral and mysterious painting of Gabriel Max represents the talent of the country. Arnold Böcklin, usually included as a German painter, was a native of Switzerland and one of the few great artists that country can boast.

In France painting did not assume a really

national character till the 18th century. The French primitives of the Middle Ages are hardly distinguishable from those of the Netherlands. The 17th century produced Claude Lorraine (1600-82) in the department of ideal and poetic landscape, and Nicholas Poussin (1594-1665) the principal exponent of classic landscape; but both masters were largely resident in Italy and were guided by Italian influence. With the 18th century came Fragonard, Boucher, Greuze, and Lancret to enchant with a style that is at once seductive and terribly reflective of the manners of their age. The highest achievement in this direction was gained by Watteau (1684-1721), the painter of "*Fêtes Galantes*." A homelier and a healthier note was struck by the *genre* of Chardin (1699-1779). Proudhon (1758-1823), whose painting was dignified even in its wantonness, and the austere classical David (1748-1825) did much to revive French art. Early in the 19th century there was a revolt, led by Eugène Delacroix, against the classic ideal in history painting, the revolutionists calling themselves Romantics and claiming the right to paint historical episodes in their own way; and out of this movement grew two groups of painters that have left an abiding mark on French painting. One was the Barbizon group of naturalists, including Corot, Jean François Millet, Théodor Rousseau, Daubigny, and Diaz; the other a section of idealists, led by Puvis de Chavannes and Gustave Moreau. After 1870 there was a great revival in mural painting, led by Puvis de Chavannes. At this period, however, even greater interest centres round Edouard Manet (1833-83), the first and the leader of the Impressionists, and round Bastien-Lepage, who has been aptly described as "a sort of Academic continuation of the naturalistic evolution." The Paris Institut, representing the academic idea, fought hard against the new doctrines, preached first by Manet and afterwards by Monet, the apostle of chromatism, Pissarro, Sisley, Cézanne, Boudin, and Renoir. But though impressionism has undergone considerable modifications from its early form, its principles have prevailed, and to-day constitute a living force not only in France, but in Great Britain and throughout the entire Continent. Besides the painters mentioned, individual forces in modern French painting have been Courbet, Benjamin Constant, Bonnat, Carolus-Duran and, more recently, Besnard and Carrière.

Before the 18th century the great names in English painting are those of foreigners. It is to Holbein that England owes her portraits of Tudor sovereigns and statesmen, and to Van Dyck those of the early 17th century. Sir Peter Lely figures as the pictorial chronicler of the Restoration, and Sir Godfrey Kneller followed, to keep alive the slick German fashion that was popular with the Hanoverian monarchs. Contemporaneously, however, a strong native painter arises in Hogarth (1697-1764), who paved the way for Sir Joshua Reynolds (1723-92), George Romney (1734-1802), and Thomas Gainsborough (1727-88). The work of these constitutes the finest period in British portraiture. With the exception, however, of Gainsborough, no artist shows a distinctive

advance in the art of landscape, the home painters both in this line and in marines being content to take their models from the Dutch. If we except Richard Wilson (1714-82), interest in this field remained dormant until Turner (1775-1851) and Constable (1776-1837). Another active power in the development of British landscape was the Norwich School, founded by John Crome (1769-1821); and it was towards the close of the 18th century that the English water-colour school, connected with the name of the Barretts, began to make its influence felt. British art, however, notwithstanding a few great names, deteriorated rather than improved towards the mid-century. Portraiture degenerated under the example of Sir Thomas Lawrence. In landscape Constable was not fully appreciated and Turner was misunderstood. A petty and commonplace spirit crept into *genre*. William Etty (1787-1849) strove valiantly for the classical ideal, but no other painter in the same branch had either his talent or his conscientiousness. An awakening influence early in the 'fifties was the pre-Raphaelite movement, and though the prime movers in this—Millais, Holman Hunt, and Dante Gabriel Rossetti—did not for long pursue a common ideal, English painting received a considerable impetus. The period 1850-75 was on the whole one of increasing prosperity and interest, controlled by a beneficent Royal Academy, and producing individual genius in no small proportion. Cecil Lawson (d. 1882), George Mason (d. 1872), and Frederick Walker (d. 1875) bear witness in their work to the advance in romantic and pastoral painting. A new group of later pre-Raphaelites, following the original band, discovered an eloquent advocate of decorative and mystic painting in Burne-Jones. The principles of French impressionism were beginning to permeate English landscape, chiefly through the audacious personality of James McNeil Whistler.

A tendency to break away from the authority of the Royal Academy was shown in 1877, when the Grosvenor Gallery was founded to provide a place of exhibition for those painters whose work was out of sympathy with existing institutions. This was the first of several independent bodies, the New English Art being one of the most important. Among local schools, that of Newlyn, including such painters as Stanhope Forbes, Walter Langley, Frank Bramley, and H. S. Tuke, long held an important position, but afterwards ceased to display particular characteristics. More distinctive was what may be called the new pre-Raphaelite school that found expression in the work of Byam Shaw, Cayley Robinson, Miss Fortescue Brickdale, and others. The portraiture of Walter Oulson, Hubert Herkomer, J. S. Sargent, and J. J. Shannon; the landscape of David Murray, Alfred East, and B. W. Leader; the decorative compositions of Frank Brangwyn, and the subject pictures of Stanhope Forbes, Frank Dicksee, Edwin Abbey, and others, represented the wide range of the painting now included under the Academic agis.

Scottish painting has been intimately connected with English since the days of Sir Henry Raeburn (1756-1823), before whose time the Scottish School,

while it included a few considerable names, suffered equally from foreign influence. Raeburn in portraiture and Wilkie (1785-1841) in *genre* introduced a fresh element into the English Academy; George Paul Chalmers, John Pettie, Hugh Cameron, and William MacTaggart were among the clever artists and brilliant colourists of the mid-19th century, and latterly the Glasgow School, ably represented by Sir James Guthrie, John Lavery, E. A. Hornel, John Lorimer, E. A. Walton, and others, did much to stimulate enterprise in the south by its invasion of London exhibitions.

In Spain there existed a primitive school during the 15th century, but there was no great Spanish painting till the time of Velasquez (1599-1660) and Murillo (1618-82). Zurbaran (1598-1662), known chiefly as the sombre painter of monks, and Ribera (1588-1656) are other famous artists of this epoch. Goya (1746-1828) is perhaps best appreciated for his etchings and lithographs, but his painting is interesting in being a connecting link between the old and the new in Spanish art.

strong native school. A famous Swedish painter is Anders Zorn (b. 1860), whose marines and interiors are full of vivacity and motion. Norway's painting suffered from a certain uncouthness as long as she remained isolated geographically. Fritz Thaulow, one of her greatest landscape painters, is now a name known throughout Europe. In Russia and the Balkan States painting is on the whole a dramatic art, reflecting the strong emotions of the country's politics. Thus we have Peroff as the painter-advocate of the serf and Verestchagin as that of the soldier. Elias Reprin was the first to paint subjects of contemporary social life. Victor Varnezooff specialises in religious themes, which he paints with barbaric splendour.

The record of painting in the United States belongs to the 19th century. What was known as the Hudson River School, which came into existence about 1817, produced some strong landscapists, but the character of the school was soon modified by the Paris influence, for the introduction of which W. M. Hunt and Thomas Hicks



TOWN HALL, PAISLEY.

Mariano Fortuny (d. 1874) was the first and most brilliant of the moderns. His sparkling colour and execution survive in the Spanish art of to-day, which, however, does not show many painters of real originality and power. Zuloaga is one of the cleverest and most original of the modern men.

In the Scandinavian countries painting is a comparatively modern development. As Stockholm is more cosmopolitan than Copenhagen, so is Swedish painting more affected by Continental influences than that of Denmark, the capital of which latter state, however, contains proof of an increasing art enthusiasm and the existence of a

were largely responsible. These two American painters were pupils of Couture. England has attracted many American artists to its shores. In former days she owed them J. S. Copley (1737-1815), Benjamin West (1738-1820), and Gilbert Stuart (1755-1828), and in later times J. S. Sargent, J. J. Shannon, Edwin Abbey, and Mark Fisher. By the 20th century the American School had gained greatly in accomplishment and repute.

Paisley, a town of Renfrewshire, Scotland, 7 miles S.W. of Glasgow, on the White Cart near its junction with the Clyde. The town grew up

round an abbey which probably occupied the site of a Roman fort (Vunduara). The abbey was founded in 1164 as a priory by Walter Fitzalan, ancestor of the Stewarts, and raised to the rank of an abbey in 1219. It was burned by the English in 1307 and suffered greatly at the Reformation, after which it gradually fell into ruin, only the nave and the chapel of St. Mirren remaining (both thoroughly restored). The principal buildings are a magnificent Town Hall, presented by George Aitken (Clark (1823-73) and his firm, the Municipal Buildings, the Sheriff Court-house, the County Buildings, the Coats Free Library and Museum and the Coats Memorial Baptist Church, one of the most gorgeous ecclesiastical edifices in Scotland. Statues have been erected to Alexander Wilson, the ornithologist, John Wilson ("Christopher North"), and Robert Tannahill, the poet, who were all natives of Paisley though, in the words of the familiar anecdote, "they couldna help it." In the manufacture of sewing-thread Paisley leads the world, other important industries being dyeing, bleaching, textiles, distilling, brewing, chemicals, the making of starch, cornflour, and preserves, engineering and ship-building. Paisley shawls, once a characteristic product, have ceased to be woven. Pop. (1901), 79,350.

Pakhpa, a people of East Turkestan, who give their name to the Pakhpalak district, on the northern slopes of the Muztagh Mountains, South Yarkand. Although described as "Tatarised Aryans," the type—tall, fair complexion, light eyes, sandy hair and whiskers, regular Caucasian features—shows that they are of pure Aryan descent, perhaps originally from Cashmere or Chitral; but they now speak a corrupt form of the Yarkand-Turki language and have long been Mohammedans.

Palacky, FRANCIS, historian, son of the village schoolmaster, was born on June 14th, 1798, at Hodoslavitz in Moravia and was educated at Pressburg and Vienna. An omnivorous reader he was led to the study of his native (Bohemian) language, became a journalist instead of a Protestant minister, and first appeared as an author with a translation of some of the poems of Ossian, which were then popular in Europe, in 1817. Removing to Prague in 1823 he was made editor of a new publication *Casopis Českého Muzea*, and held the post until 1838. In 1829 he was appointed historiographer of Bohemia, which necessitated his consulting the public libraries of Munich, Berlin, Rome and elsewhere. Palacky spared no pains in research. At the Vatican he read through 45,000 documents in ten weeks, copying 400 with his own hand. His *History of the Bohemian People*, which ends with the year 1526, when the political independence of the Czechs ceased, earned him the admiration and gratitude of his countrymen. He reluctantly took part in the movement of 1848 and was made leader of the national as opposed to the German party. They demanded, among other things, that Bohemia should be placed on a similar footing in the empire to Hungary, but the Diet refused their claims. Though possessing great influence, Palacky willingly retired to his literary labours and published

works dealing with the Hussite wars and the Bohemian language. His last years were devoted to revising his great *History* which the censorship and want of original documents had rendered unsatisfactory. His wife died in 1860, he was made a life member of the Austrian Senate in 1861 and died at Prague on June 26th, 1876. In 1878 a new bridge across the Moldau, in Prague, was named in his honour.

Palæechinoidea, a sub-class of Echinoidea, or Sea-Urchins, including all the Palæozoic and some Triassic species. The only character by which it differs from the other sub-class, or Euechinoidea, is that the plates are not arranged in twenty zones. It includes four orders—the Bothriocidaroida, Perischoechinoidea, Plesiocidaroida, and Cystocidaroida. Palæechinus is the best-known genus.

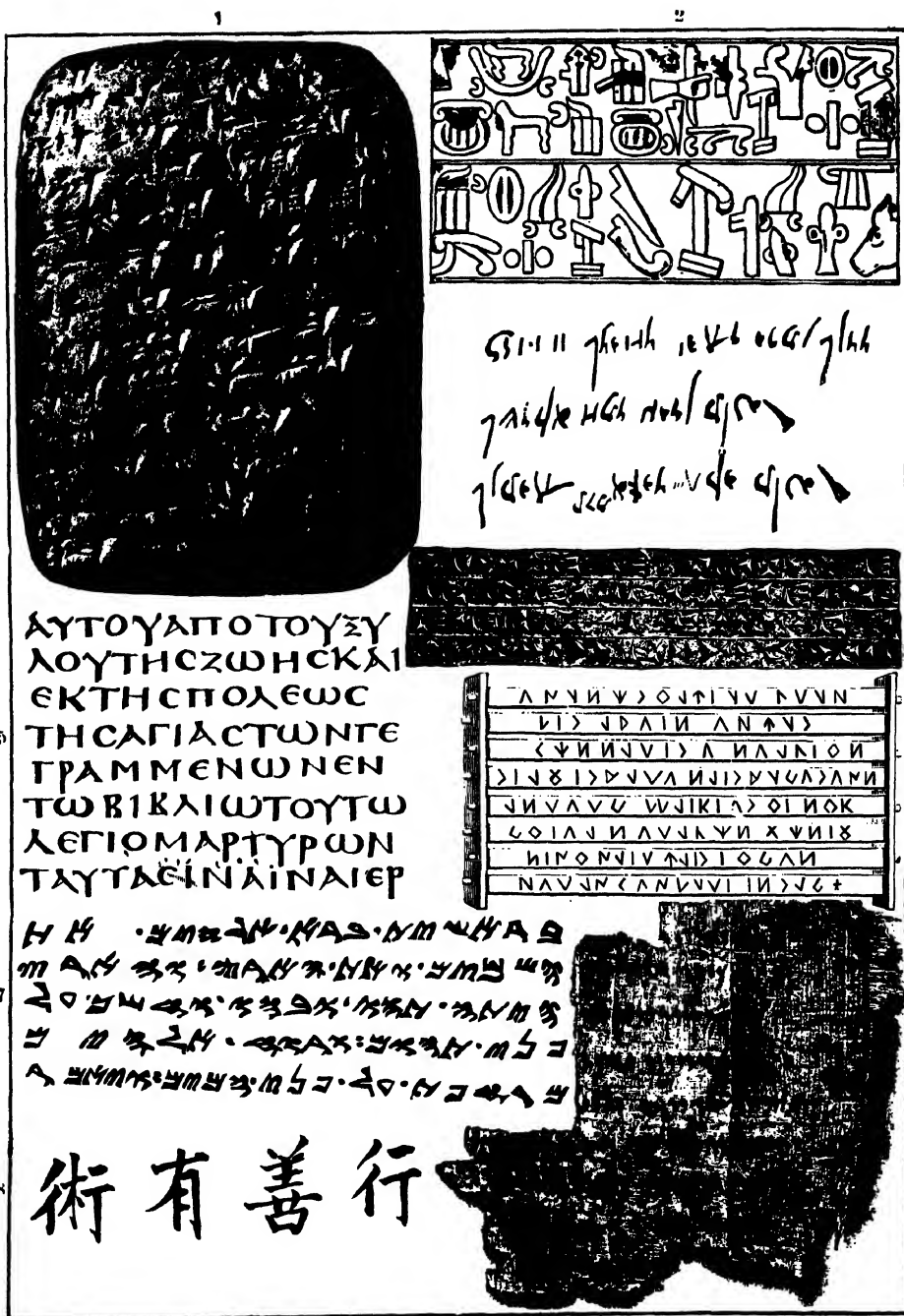
Palæichthyes, a sub-class of fishes, containing the Ganoid Fishes and the Elasmobranch Fishes. [CARTILAGINOUS FISHES.]

Palæoblattina, is the oldest known insect. It belongs to the order Palæodictyoptera and is found in the Silurian rocks of the department of Calvados, in Normandy.

Palæobotany, the science which deals with the investigation of the plants which belonged to former periods of the earth's history and which have been preserved in fossilised states. The subject divides itself into three sections—the botany of the Palæozoic age from the oldest rocks in which vegetable remains occur, that of the Mesozoic, or succeeding era, and that of the Tertiary, or most recent extinct flora. Types of the Palæozoic are the Equisetum, Sphenophyllum, Lepidodendron and Sigillaria. Tree Ferns and other examples of the rich vegetation of the Lower Carboniferous. Of the Mesozoic flora Glossopteris and the Cycads are representative, while Angiosperms and many flowering plants are characteristic of the Tertiary, in which forerunners of still existing trees and plants are plentiful.

Palæocoryne, a genus of fossils from the Carboniferous rocks of Scotland. It is of interest as it was originally referred to the Hydrozoa and the order Corynida. It is, however, now known to be really part of a Bryozoa.

Palæodictyoptera, an extinct order of insects including all the Palæozoic and a few Triassic species. The order was founded by Scudder and, as formerly diagnosed, includes a group of insects with an incomplete metamorphosis, two pairs of wings which are equal in size, membranous in texture, and simple in the arrangement of the thickened lines usually known as "nerves"; their characters are therefore of a simple primitive type. The value of the order is, however, very doubtful, and it appears most probable that it will have to be split up among the four orders of Orthoptera (cockroaches, etc.), Neuroptera (May-flies, etc.), Hemiptera and Coleoptera (or beetles). Thus the oldest known insect Palæoblattina, the Carboniferous cockroach Progonoblattina, and the old "stick-insect" Protoplasma appear to be primitive forms



PALÆOGRAPHY.

1. TABLET FROM TELL-EL-AMARNA.

2. HITTITE INSCRIPTION.

3. EGYPTO-ARAMAIC INSCRIPTION

4. CUNEIFORM INSCRIPTION.

5. GREEK WRITING.

6. RUNIC.

7. FACSIMILE OF SAMARITAN

8. SPECIMEN OF ARAMAIC WRITING.

of the Orthoptera. Platephemera is probably an old member of the Ephemeridae or May-flies. Lithomantis and Mimia are also both allied to the Neuroptera. The Hemiptera or Rhynchota are represented by the Permian Eupereon and Fulgorina, and the Coleoptera by some beetle's wing-cases or elytra and some borings in the Carboniferous.

Paleography (Greek, *palaio*, ancient; *graphie*, writing), the science which deals with the deciphering of ancient manuscripts, their date and genuineness. Unlike the epigraphist who deciphers only ancient inscriptions on stone and metals, the paleographer deals with the writings of both Oriental and Occidental races on soft substances such as papyrus, linen, leaves, bark, leather, and wax tablets, or, later, on parchments from which a previous writing had been erased or partially erased, a second inscription being superimposed, such parchments being known to the paleographer as palimpsests.

EGYPTIAN. The oldest manuscripts with which we are familiar are those from Egypt. The material on which they are written are rolls made from the pith of the papyrus plant (*Cyperus Papyrus*), that grew in abundance throughout the Nile Delta. The oldest of these papyri (for the material and the matter written on it came to be thus described indifferently) is the *Papyrus Prisse* at Paris, which is said to contain some writing composed during the Fifth Dynasty (the date of which is variously given as between 3951 and 2840 B.C.), while the roll itself bears the date of about 2500 B.C., thus making it many centuries older than the Biblical Exodus. Buried with some great monarch they have lain, sometimes swathed in the folds of mummy-cloths, or occasionally in a beautifully enamelled casket by the side of the mummy until unearthed, many centuries later, by the excavator's shovel, often as clean and fresh as on the day they were written, owing to the dryness of the Egyptian climate. Whenever Professor Flinders Petrie, head of the Egyptian Exploration Fund, returned to England it was his pleasant custom to bring something new for the study of the paleographer, and it was to his careful research and excavation that numerous papyri rolls containing the *Books of the Dead* came to light.

GREEK. The first trace of Greek papyri was found near Memphis, in Egypt, in 1778, but unfortunately, owing to ignorance in such matters, the finder allowed forty-nine of the fifty rolls that were found to be destroyed, only one finding its way to Europe. This bears the date of A.D. 191, and is by no means the oldest, for at the village of Gurob Professor Flinders Petrie found, in the mummy-chests, documents and wills dating from the 3rd century B.C., in addition to fragments of the *Autops* of Euripides, a copy of the *Phaedo* of Plato written one hundred years after the philosopher's death and thus disclosing the material on which Plato's works were written. There was also discovered the private correspondence of Ptolemy, son of Glaucias, a Macedonian Greek, with the officials of the Temple of Serapis dating from about 170 B.C. These were also found

at Memphis on the site of the Serapeum and to the paleographer their value cannot be over-estimated. During the middle of the 19th century (1845-50) papyri were found at Ma'abdeh by Mr. A. C. Harris and were deciphered as being fragments of the books of Homer's *Iliad*. Besides these, Homeric papyri have been found by William Bankes, since called "Bankes Homer"; and later still Harris found another book on the back of which was found a treatise on Greek grammar. Other Greek papyri, when deciphered, have been ascertained to contain orations of Hyperides, Lycophron, and Euxenippus relating to Demosthenes, the Greek general Leosthenes, and Phillipides. From the ruins of Herculaneum — where, it is stated, 1,803 rolls of papyri were buried, only a few have come to light, and these in consequence of their charred condition are scarcely recognisable. Attempts have from time to time been made to unroll them and decipher their contents, but owing to their flimsy and decayed nature it has to be done with the utmost care. The writing that exists on Greek scripts shows signs of many changes; it is clear that there were two distinct styles—namely, the uncial or book hand used by the scribes and writers of books and documents and the cursive, employed in ordinary correspondence between two people. In the earliest scripts the paleographers have great difficulty in drawing the line between the two, but the private correspondence of Ptolemy already mentioned is an excellent example of the cursive writing of the early Greeks. The book hand of a later date became more distinct from the cursive, the letters being formed in upright, clear, intelligible capitals and later transformed into uncials, sometimes to save space and sometimes for quickness. Thus E in the early writings was made by four strokes of the reed or stylus and afterwards, when uncial writing was adopted, it would be made in two strokes—thus ε. About the 8th or 9th century this uncial writing gave way to a new writing evolved partly from the cursive and partly from the uncial, thus giving the letter a much smaller size in book writing, a practice that continued down to the time of printing. The cursive writing—the earliest example of the use of which was found at Gurob in the Fayoum, owing to the mummy-chest-maker utilising registers and wills in the making of the chests—is a less distinctive, more careless hand, rendering it more difficult to read, and only occurs in the signing of these registers, charters and wills, or in private correspondence.

LATIN. Latin paleography followed much the same course as its predecessor, the Greek. There were the literary or book hand and the cursive. In the book hands the writing differs as time passes, and can be classed as Rustic Capital writing, Square Capital writing, Uncial, and Semi-Uncial, the latter two being adopted from the Roman cursive. The most ancient form of writing Latin books was in rustic capitals, which were crudely written and lightly and quickly formed. The best example of this early rustic writing is part of a poem on the battle of Actium which was recovered from the ruins of Herculaneum, dating

from the 1st century. By the 4th and 5th centuries this rustic hand had given way to a clearer and more intelligible writing, namely, square hand, of which the *Virgil* written at that date and now in the Vatican is the best example. The letters are squarely-formed, distinct capitals such as a writer might describe in the present day, bearing a striking contrast in the thickness of the stroke to the rustic writing. But this style had not come to stay; the great expense to which the early writers were put in getting their books written and in procuring papyri for their enormous if handsome capital writing made them look to a smaller hand. Thus, as in the Greek, uncial letters were introduced. About the end of the 5th century this form of writing made its appearance, the principal characteristic of the change being the smaller letter formed in a round hand, easier to carve or write, and doing away with the square capital writing in book writing, except in texts and the beginning of sentences. During the 6th and 7th centuries this uncial writing reached its prime, the letters being clearly and distinctly formed, but during the 8th century uncial writing began to degenerate, the letters being badly formed and in many cases entirely unintelligible. Two good examples of uncial writing are a copy of the Gospels now in Corpus Christi College, Cambridge, and the Codex Bezae, also at Cambridge. Next came the half-uncial half-Roman-cursive writing which plays an important part among Latin races of the present day. The semi-uncial writing is a modified form of the uncial and was quickly adopted by the Latin scribes. The first example of this type appears as early as 487 in a palimpsest at Verona and again in the MSS. of St. Hilary of Rome, written in 509-510 and now preserved in the Chapter Library of St. Peter's at Rome. From this it is seen that the Roman cursive began to influence the older uncial writing during the 5th century, but cursive writing existed in Latin long before this. Among the earliest materials of the cursive are the scribbles and writings on the walls of Pompeii, sometimes traced by a brush and at others by charcoal or chalk and consisting merely of idle or obscene words, salutations, or satirical remarks on people of the period. Similar writings have been found in the catacombs of Rome and Herculaneum, dating from the 1st century. The cursive writing is simply the Roman letters written with speed, the letters in some cases undergoing great changes and forms. As in the Greek, this writing was found only in private correspondence and signatures to documents.

At the fall of the Roman Empire a number of national scripts arose. France, Spain and Italy based their present writing upon the Roman cursive. In the current German language distinct traces of it can be found. The modern English is based upon the early Anglo-Saxon cursive, improved by the Latin writing of mediæval history, and the adoption in the Court of Elizabeth of almost the Italian hand led to the existing script.

Palæolithic, of or belonging to the older Stone Age. This Age is the oldest prehistoric

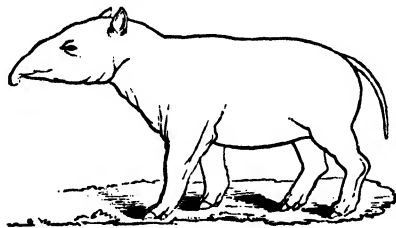
division of the human period, when, towards the close of the Glacial Period, man was associated with an assemblage of mammals, many of which are extinct, and used rude stone implements, chipped but not polished. The remains of this Age are obtained from high-level river-gravels and brick-earths, and the lower deposits in some caves. The fauna of these deposits contains an admixture of northern and southern types, including lion, hyæna, and hippopotamus, with reindeer, glutton, lemming, and musk-ox, together with the extinct mammoth, the woolly rhinoceros, and the cave-bear, and, perhaps, *Elephas antiquus*. Bones of man himself belonging to this Age have rarely been found; but in some of the caverns in which they do occur, as in that of La Madeleine, in Périgord, they are associated with rudely-executed but graphic incised pictures of the mammoth, reindeer, and other animals, cut by primitive man on bone and ivory. Palæolithic man in North Europe seems to have been mainly engaged in hunting and fishing. The period has been divided into two sections—Palæolithic and Neolithic—in the latter of which the stone implements show a higher degree of finish and are supposed therefore to typify prehistoric man in an appreciably less crude state. [FLINT IMPLEMENTS.]

Palæologus, the name of a Byzantine family which came into prominence in the latter half of the 11th century, when GEORGE PALÆOLOGUS helped to confer the purple on Alexius I. Comnenus (1081) and to defend Durazzo against the Normans. MICHAEL (1234-82), in 1260, raised himself to the imperial throne, and founded a dynasty which only ended with Constantine XIII. (1448-53), the last emperor of Byzantium. The brothers of this latter held sway for some years longer in the Morea and Achaia, whilst Zoe, his sister, married Ivan III. of Russia.

Palæontology (Greek, *palaios*, "ancient"; *onta*, "beings"; *logos*, "science") is the science of fossils. In its method it is largely a distinct science; but in its results it may be considered as the contribution of geology to biology. Owing to the merely partial preservation of their remains, fossil plants and animals are studied from somewhat different points of view from those of which flowers or muscles are still available; and, whilst all existing plants and animals are contemporaneous, one of the chief interests in the study of fossils arises from their presenting to us the floras and faunas of successive past periods of the earth's history. Fossil organisms not only add large numbers of species and genera to those now known as living on the globe; but many of them belong to extinct types, some of which are generalised, or combine the characters of groups which have since become distinct and may, therefore, well be looked upon as ancestral. Though there is abundant evidence of a general succession, or advance of organic types, the lower in organisation being, on the whole, the earlier in appearance in time, there is still a great imperfection of the palæontological record. Thus we have no geological evidence as to the beginnings of life on the globe,

the earliest known assemblage of fossils, that in the Lower Cambrian, containing representatives of nearly all classes of invertebrate animals. Again, though in many groups, as, for instance, among ungulate mammals, there is now known to be a large graduating series of genera, in this and in many other groups it is impossible to point to the minute intergradation of species which would seem to be required by the theory of natural selection. In other groups, however, such as the brachiopods, ammonites, and whelks, such an inter-gradation can be fairly well shown. This imperfection of the record arises in part from the as yet incomplete investigation of fossiliferous rocks; but also from the destruction by denudation of such rocks as were once in existence; by the obliteration of the fossils in others, as by percolating water or crystallisation due to heat; or, still more, from the scant chance of preservation, as fossils, of the remains of plants and animals dying at a distance from water and its preserving mud. These latter causes render many of the gaps in our knowledge irremediable. Nevertheless, Sir Archibald Geikie expresses the opinion that "it must be conceded that, on the whole, the testimony of the rocks is in favour of the doctrine of evolution."

Palæotherium, a genus of extinct ungulate mammals, the type of a family, Palæotheriidae, which combines the characters of the rhinoceros, tapir, and horse. The species range in size from that of a pig to that of a horse, four or five feet high. They had a short, fleshy snout, like the



PALÆOTHERIUM.

tapir, but had only three toes on each foot. The range in time of the genus is from the Middle Eocene to the Upper Oligocene, the earliest types being described by Cuvier from the gypsum beds of Montmartre in Paris.

Palæozoic Rocks, the oldest group of fossiliferous rocks, formerly termed Primary. They consist largely of sandstones and shales, with greywacke and slate in the lower part of the group, and limestone, coal, and dolomite in the upper, and numerous great thicknesses of contemporaneous volcanic rocks. The group is subdivided into six systems, as follows:

UPPER PALÆOZOIC.—Permian System.
Carboniferous System.
Devonian System.

LOWER PALÆOZOIC.—Silurian System.
Ordovician System.
Cambrian System.

On account of their great relative age, Palæozoic

rocks have been more subject to disturbance than others, and are often bent, contorted, faulted, cleaved, and otherwise metamorphosed, whilst the Secondary or Mesozoic rocks commonly rest unconformably upon them in more horizontal positions. The fossils of the Palæozoic rocks are widely different from living organisms. In the lower systems there is little evidence of plants or land-animals. The plants of the upper systems include large club-mosses and horse-tails, ferns and conifers; but no known angiosperms. The corals belong mainly to the Tetracoralla; sea-urchins are rare, and have more than twenty rows of plates; and the extinct classes of echinoderms, the Blastoiden and Cystoiden occur, as well as numerous crinoids. Graptolites, trilobites, and Eurypterida are confined to Palæozoic rocks, and Orthoceratidae, straight allies of the pearly nautilus, are nearly so. Brachiopoda were more abundant than in subsequent times; Pelecypoda and Gasteropoda less so. The insects all belonged to an extinct generalised subclass, the Palæodictyoptera; and the fish had cartilaginous skeletons and unequally-lobed tails. No mammals or birds are known from Palæozoic rocks. Only sixteen genera of organisms, and no species, are now alive that were living when they were deposited.

Palafox Y Melzi, José DE, general, was born in Spain, in 1780. Entering the guards at an early age he rose to the rank of brigadier-general. In 1808 he accompanied Ferdinand to Bayonne, but when the king abdicated he escaped. While living in retirement the inhabitants of Saragossa made him governor of their ancient city and captain-general of the kingdom of Aragon. He strenuously opposed the French who overran the neighbouring provinces and laid siege to Saragossa on July 22nd. In spite of an obstinate resistance, accentuated by want of troops and money, by August 4th the French held nearly half the town. When summoned to surrender Palafox replied with the famous message, "War to the knife." The next day his brother forced an entrance into the city with 3,000 men and it was enthusiastically determined to dispute every inch of the ground and, if needful, to retire across the Ebro, which divides the city into two parts, and destroy the noble stone bridge, built in 1437. After a further struggle the French withdrew on August 14th, but the siege was renewed in November. After a heroic resistance, during which some 50,000 of the inhabitants died, partly through an epidemic, a capitulation was signed on February 21st, 1809. Palafox was taken prisoner to France and confined at Vincennes, not being released until 1813. In 1824 he was created Duke of Saragossa and, in 1837, Grandee of Spain. He died at Madrid on February 15th, 1847. The services of the "Maid of Saragossa" seem to have been exaggerated.

Palanquin, a covered litter, used in India and other Eastern countries, with poles fitted to it before and behind, so that it is borne on the shoulders of two, four, or six bearers. It is generally constructed to hold one person, being a box

about eight feet long and half as wide and high, with shutters like light Florentine shutters. The Japanese palanquin or *norimono* is suspended from one pole fixed along the top. In Japan, however, the palanquin has been largely replaced by the jinricksha, which Mrs. Bishop describes as a vehicle with a "light perambulator body, an adjustable hood of oiled paper, a velvet or cloth lining and cushions, a well for parcels under the seat, two high slim wheels, and a pair of shafts connected by a bar at the ends." It was introduced in



JAPANESE PALANQUIN.

1870 and, strangely enough, was not invented by the Japanese, but by a missionary named W. Goble. Jinrickshas are drawn by one or more men, who will run for hours without fatigue, an example of staying power which is obviously reflected in and probably suggested the Japanese name (*jin*, "man"; *riki*, "strength"; *sha*, "vehicle").

Palate, the roof the mouth. Anteriorly, extending between the alveolar processes of the upper jaw, the palate has a bony framework, upon which the mucous membrane of the upper part of the mouth is moulded. This is the hard palate. Behind it lies the soft palate, which has no bony support, but arches over, forming on each side what are known as the pillars of the fauces, and in the middle line a projection which is called the uvula. The pillars of the fauces are two in number on either side—anterior and posterior—and between the anterior and posterior pillar of each side lies the tonsil. Cleft palate is met with in young children as the result of non-union of parts by maldevelopment. It is often associated with hare-lip and requires to be treated by surgical operation.

Palatinate (German *Palz*, "palace"), the named used to designate the fief of the Palsgaves or Counts Palatine of the Rhine, who from the 11th century had their seat at Aix-la-Chapelle and ruled over a wide and productive area of 2,293 square miles, extending from Mayence to Trèves. It included the Electoral Palatinate, the principality of Simmern, the duchy of Zweibrücken, the principalities of Veldenz and Lautern and part of the county of Sponheim. This constituted the

Lower Palatinate, or Palatinate of the Rhine. In the 13th century the province passed into the family of the Duke of Bavaria by the marriage of Otho II. with Agnes, heir to the Suabian Palsgaves, and thus there came into existence an Upper Palatinate in Bavarian territory, with an area of 3,750 square miles, lying between Bavaria proper, Bohemia, and Nuremberg. In 1623 the two districts became separated and, until 1777, remained asunder, being then reunited under Charles Theodore. By the Treaty of Paris (1814-15) a fresh partition took place. Most of the Electoral or Lower Palatinate was given to Prussia, of which it still forms part, and a small share to Hesse-Darmstadt, whilst the Upper Palatinate passed into Rhenish Bavaria, with the exception of a strip, which was added to Baden.

Palatine, holding or pertaining to a high office in an imperial palace (Latin, *palatinum*), originally the office of treasurer to the Roman and Byzantine emperors. In France and Germany in the Middle Ages the term was applied to the jurisdiction of high officials under the Empire who enjoyed royal privileges, and later especially to the electoral principality known as the Palatinate. In England county palatines (*i.e.*, Lancaster, Chester, and Durham) enjoyed royal and exceptional privileges, such as special courts, judges, constables, and stewards, and even a parliament of their own. Chester ceased to be a county palatine in the reign of Henry VIII., Durham in 1836, and Lancashire relinquished its jurisdiction in favour of the High Court of Justice in 1873.

Pale, a territory within more or less definite boundaries, or a district subject to a particular jurisdiction. In Ireland, the Pale was that part of the country (the extent of which varied at different periods) over which English law was established. Usually, it was applied to Dublin and portions of the adjacent counties. Up till the time of Mary the English Pale in France denoted the territory of Calais and the vicinity.

Palembang, a residency (once an independent kingdom) in the south-east of Sumatra, Dutch East Indies. Pop., 650,000. The capital, of the same name, is situated on the Musi, 45 miles from its mouth in the Strait of Banca. The town extends for three or four miles along the river, here 200 yards wide, the inhabitants living in house-boats at anchor, or in dwellings built upon piles. The industries are insignificant, but it is an important emporium of trade. Pop., 53,000.

Palencia, capital of the province of Palencia, Spain, on the left bank of the Carrion, 115 miles N. by W. of Madrid. The chief town of the Vacei it was a place of some importance in the Middle Ages. The first university of Castile was established here in 1208 by Alfonso IX. and removed to Salamanca in 1239. The principal buildings are the Cathedral (1321-1504), in debased Spanish Gothic; the fortified 13th-century church of San Miguel; and the hospital of San Lazaro, dating from the time of the Cid, who was married to Ximena in Palencia in 1074. The industries

include textiles, leather, pottery, machinery, matches, alcohol and rugs. Pop., 16,118. The area of the province of PALENCA is 3,127 square miles and its population, 193,668.

Palenque, a village in the state of Chiapas, Mexico, 78 miles N. of San Cristobal. Near it exist some of the finest ruins of Central America, comprising temples adorned with figures in relief and hieroglyphs, pyramidal structures, colossal statues, and other remains, probably of palaces and dwellings, covering a large area and overgrown by dense jungle. They were discovered in 1750.

Palermo (classical *Panormus*), capital of Sicily, on the northern coast of the island and the bay of Palermo. Founded by the Phœnicians, it became the centre of Carthaginian power, retaining for many centuries its Semitic associations. In 254 B.C. it fell into Roman hands, where it remained until Genseric captured it in A.D. 440. Belisarius recovered it a century later, but in 835 the Saracens made it their capital. The Norman Guiscard next became its masters and Palermo enjoyed independence, if not supremacy, from 1071 to 1282, in which year the inhabitants rose against their French oppressors and perpetrated the massacre of the Sicilian Vespers. It has since shared the fate of Sicily and was finally reduced from its position as capital of a kingdom to that of a provincial chief town in 1860, when it was taken by Garibaldi. Conspicuous among its buildings are the Metropolitan church; the Chapel of King Roger, one of the most beautiful palace-chapels in the world; the Martorana; and the mosque-like edifice dedicated to San Giovanni degli Eremiti; the archiepiscopal palace, and public library; and the National Museum. The city is the seat of an archbishopric and a university, has a fine botanical garden, and is the centre of administration for the island. The harbour is protected by moles. Though industrially the city does not rank high, there is an arsenal, and ship-building and iron foundry are carried on, while the fisheries are active. The manufactures include silk and cotton goods, gloves, straw hats, and chemicals. Fruit, agricultural produce, wines, oil, skins, liquorice, manna, sulphur and sumach are exported. The winter climate is delightful. Pop. (1901), 309,964.

Palestine (*Palestina*), or the HOLY LAND, the southern part of Syria, comprising the region apportioned by Joshua among the twelve tribes of Israel, but never occupied by them throughout its whole extent. It lies between 31° and 33° 20' N., and 34° 30' and 37° E. It is bounded on the W. by the Mediterranean; on the S. by a line drawn westwards from the southern end of the Dead Sea; on the E. by the desert of Syria and Arabia, and on the N. by the Lebanon and Anti-Lebanon. The area of the cis-Jordanic portion is 6,000 square miles, and that of the remainder cannot at any time have exceeded 3,800 square miles. Just as the old name Canaan denoted originally the low-lying country along the coast, so Palestine means literally "Land of the Philistines," and was not

used of the inland districts before the time of the Romans.

Physical Characteristics. Notwithstanding its narrow limits, Palestine presents a remarkable variety of surface, scenery, and climate. The central portion consists of an undulating tableland (the "hills" or "hill-country"), separated from Lebanon on the north by the fertile Plain of Esdraelon (Jezreel), which is 20 miles long and 9 miles broad. Palestine has a gentle slope towards the west, but descends abruptly to the Jordan valley, the surface gradually rising, as it extends southwards, till it reaches its greatest elevation (about 3,300 feet) in the neighbourhood of Hebron, beyond which, near Beersheba, it sinks into the Idumean Desert (Edom), south of the Dead Sea. The northern part of this tract is more fertile than that towards the south, the least productive district being the country round Jerusalem; but even there the vine is grown with success, and the barren aspect of the plateau is relieved in many places by gardens of olives and figs and luxuriant cornfields. There is no reason to suppose that the quantity of timber in this region—as represented by the oak, terebinth, fir, sycamore, cedar, acacia, etc.—has decreased since the Old Testament period. To the west of the central tableland and the Lebanon ranges, north and south of Mount Carmel, there runs a strip of low seaboard, which expands into the plain of Philistia as the coast trends away to the south-west. To the north of Philistia (an agricultural district with a rich soil) is the Valley of Sharon, once the Garden of Palestine, but now for the most part a marshy or sandy wilderness, owing to the destruction of the irrigation system and the formation of dunes to a distance of several miles inland. To this section belongs also the Shephelah ("low ground"), a low ridge between the high watershed range and the plain, renowned both in ancient and modern times for the excellence of its crops. The maritime plain is intersected by deep gullies, traversed in some cases by perennial streams. Oranges, lemons, citrons, bananas, and melons grow luxuriantly, especially in the gardens of Jaffa (Joppa) and Ascalon. East of the central tableland is a deep fissure (El-Ghôr), increasing in width from 5 to 13 miles, down which the Jordan flows with tortuous course (100 miles as the crow flies, but in reality nearly twice that length), from the base of Mount Hermon (1,000 feet above the Mediterranean), through the waters of Merom (Bahr-el-Hulch), to the Dead Sea, which is 1,292 feet below its level. Beyond Jordan is another upland district, forming a prolongation of the Anti-Lebanus ranges, with an elevation of 2,000 to 3,000 feet, succeeded on the East by a plateau which stretches away to the Arabian Desert. This region contains wide tracts of excellent pasture. The highest point in Palestine is Jebel Jermuk (3,934 feet). The height of Ebal is 3,084 feet; that of Gerizim 2,849 feet; and that of Carmel—a north-western spur of the uplands terminating in a promontory—1,740 feet. The Jordan is the only important river; but the Kishon—a turbid stream, swollen after the rains, but dry for part of its course in summer—is interesting from its Biblical associa-

tions. Springs are abundant in the hill-country of Galilee, Samaria, and Judea; but in Philistia the water-supply is derived entirely from cisterns. The climate varies greatly in different districts. The rainy season begins with the autumnal equinox. Thunderstorms are common in November and December; but the heaviest fall takes place in January, after which the weather begins to clear, though rain does not cease till the vernal equinox is over. With the exception of a single heavy shower in June or July, there is seldom any rain between the end of April and the beginning of October.

History. The giant races to which allusion is made in the Old Testament—*racés* of Aramaean descent, and therefore akin to the Israelites—were conquered by tribes known collectively as Canaanites, whom the Israelites found in possession when they arrived from Goshen (about 1274 B.C.). According to the Biblical account, they were Hamitic, but linguistic evidence points rather to a Semitic origin. The Philistines in the south-west belonged to a different stock; their ancestors must probably be sought amongst the Egyptian Caphtorim. These races were not extirpated, nor did they lose the whole of their territory, for the limits assigned to the Israelitish tribes must be regarded as prospective rather than actual. The central tableland or hill-country west of the Jordan was the only part of Palestine of which they ever secured a firm hold. The Philistines especially maintained their supremacy over a considerable area, and long after the migration they frequently inflicted crushing defeats on the Israelites. There is even some ground for believing that the modern Fellahin are descended from the people who occupied the land before the Jewish invasion. East of the Jordan, Israel carried on a ceaseless struggle with various Semitic tribes. The children of Reuben were frequently driven from their walled towns by Moabites from beyond the Arnon, and farther north there were the Amorites in Gilead and Bashan, and the Ammonites on the confines of the Arabian Desert. Moreover for several centuries after the Jewish settlement, these tribes, with others of the same stock—Amalekites and Midianites from the south and south-east—often invaded Palestine proper and held it for long periods as a tributary province. In all cases they were eventually driven out by leaders called Judges (*Shofetim*), who exercised temporary authority over one or more tribes. After the choice of a single and permanent king (1067 B.C.), the sense of national unity grew stronger and tribal distinctions tended to disappear, although Ephraim fostered a jealousy of Judah which ultimately led to the most disastrous results. Under Saul's successors Israel advanced to a high position among the nations of the East. The stately city which grew up on the site of the rock-fortress wrested by David from the Jebusites became the capital of the dominion extending from the Euphrates to the borders of Egypt, and the treaty of Solomon with Hiram, King of Tyre, brought the Jews into commercial relations with the most remote regions of the known world. This period of prosperity (1055–977 B.C.) was brought to a close by the dissension which resulted in the forma-

tion of two separate kingdoms—Judah and Israel—the former comprising the tribes of Judah and Benjamin, to which were afterwards added parts of Simeon and Dan. Jerusalem remained the capital of Judah, whilst that of Israel was eventually established at Samaria. Syria was at first the most formidable enemy of Israel; but later the weakness of both kingdoms exposed them to the attacks of a more distant and more powerful foe. In 721 the ten northern tribes were carried captive to Assyria, their place being taken by colonists, who are supposed by some to have been the ancestors of the Samaritans. After the lapse of 133 years the people of Judah shared the same fate. A decree issued by Cyrus of Persia after his conquest of Assyria restored the tribes of Judah and Benjamin to their former abode (536); but the fate of the ten other tribes has always remained a mystery. During the period of their subjection to Persia, the Jews were governed by a satrap who resided at Damascus, the high priest acting as his deputy at Jerusalem. In 332 Palestine became a part of the Macedonian Empire. On the death of Alexander the Great it passed to the Ptolemies of Egypt, from whom, after perpetual conflicts, it was wrested by the Seleucid monarchs of Syria towards the end of the 3rd century. The tyranny of Antiochus Epiphanes (170) excited a national rising, led by the Maccabees, who established a theocratic form of government, the high priest exercising political functions. Hyrcanus II., the last of the Maccabean or Asmonian line, became tributary to Rome in 63, the political power being shared by the Idumaean Antipator, whose son Herod was in 40 B.C. recognised by the Romans as sole ruler of Judea. On his death, in 2 B.C., his dominions were divided between his three sons. Judea (comprising the district south of Mount Ephraim), together with Idumaea on its southern border and Samaria to the north, was allotted to Archelaus, who assumed the title of ethnarch. Galilee (to the north of Samaria) and Peraea (occupying the east bank of the Jordan as far north as the Lake of Tiberias) fell to the tetrarch Herod Antipas. Herod Philip, also styled tetrarch, ruled in the region east of the Upper Jordan, including Gaulanitis, Batanea, Auranitis, Trachonitis, and Iturea. In A.D. 6 Archelaus was deposed and his territory was placed under the government of a Roman procurator. The Jews prospered under Roman rule; but they could not endure the yoke of the stranger and broke out in fierce insurrection, which was quelled by Vespasian and Titus (66–70). Soon afterwards the whole of Palestine was incorporated in the province of Syria. After the revolt of Bar-Cochba (136), the treatment of the Jews became even sterner; they were not allowed to approach the walls of their holy city, now a Roman town (*Ælia Capitolina*), with a temple to Jupiter on the site of Solomon's. The religious fervour which characterised the three centuries succeeding the conversion of Constantine manifested itself in Palestine in its most exaggerated forms. The land became the scene of vehement theological disputes; its solitudes were peopled by anchorites and stones were torn from forts and synagogues to build the monasteries which sprang

up on every side. The rule of the monk was brought to a close by the invasion of Chosroes II. of Persia (614), and before Palestine had time to recover from this disaster it fell into the hands of the Saracens (636). El Islâm now became triumphant in the Holy Land and it was only by abject submission that the Christians were able to purchase a contemptuous toleration. In the 11th century the weakness of the Egyptian Caliphate enabled the Seljuk Turks to add Palestine to their possessions. The insults offered to pilgrims by the new rulers excited the indignation of western Europe and gave

Present Condition. Politically, Palestine comprises the four livas of Jerusalem (El Kuds), Nablûs, Acre, and the Hauran, each governed by a mutessarif under the vâli (ruler of the vilayet), who is immediately responsible to the Porte. The settled inhabitants, who number about 620,000, are a mixed race, the descendants of the old Aramean population and their Saracenic conquerors, but the Bedouins are pure Arabs. Arabic is the language in general use. Religious differences are strongly marked, the Mohammedans, who form about 80 per cent. of the inhabitants, regarding the various Christian Churches with the utmost contempt. There are still settlements of Druses in Galilee and on Mount Carmel. Up to a recent date the Jewish population was almost wholly confined to the four sacred cities—Jerusalem, Hebron, Tiberias, and Safed. The number of Turks is not large; they constitute the official class and are regarded with an abhorrence which is fully justified by their extortionate government. During nearly four centuries of Ottoman misrule Palestine has been reduced to a state of abject misery. Ruined aqueducts, cisterns, and dwellings testify to the decay into which the country has fallen since the prosperous days of the Romans. Industries which thrived in the Middle Ages have been abandoned and little effort is made to take advantage of the abundant resources of the soil. There are few exports beyond sesame, fruits, barley, olive-oil and maize shipped from Acre, Haifa and Jaffa. An attempt is now being made to open up the country, the chief result so far being the construction of several roads—quite a new feature in Palestine—and also a railway from Jaffa to Jerusalem (opened 1892). The Jewish immigration which has set in of late years continues in spite of Turkish opposition; and German colonies have been planted in the neighbourhood of Ramleh and Jaffa. These and other changes are altering the aspect of the country and the character of the inhabitants. Meanwhile the expedition of the Palestine Exploration Fund have supplied the first accurate information regarding the topography and antiquities of the Holy Land. Many lost Biblical sites have been identified and the several volumes of the *Survey of Western Palestine* have superseded all older authorities.



SKETCH MAP OF PALESTINE.

rise to the Crusades. The First Crusade resulted in the formation of the Christian kingdom of Jerusalem, which was organised on the feudal model, with vassal principalities in Palestine and Syria (1099). Within 100 years Jerusalem was taken by Saladin (1187) and, with the exception of the brief period during which it was ruled by the Emperor Frederick II. (1228-1244), it has remained in the hands of Moslems ever since. In 1244 the land was overrun by the Chormasians; but it was soon afterwards recovered by the Mameluke Sultans of Egypt, who were left in undisturbed possession after the capture of Acre, the crowning catastrophe of the Crusades, in 1291. In 1517 Selim I. added Palestine to his dominions and since that date it has formed part of the Ottoman Empire.

Palestrina, GIOVANNI PIERLUIGI DA, composer, was born at Palestrina, Italy, about 1524, and studied music under Goudimel. In 1551 he was appointed choir-master of the Capella Giulia in the Vatican, and subsequently held similar posts at the Lateran and Santa Maria Maggiore in Rome. The Council of Trent in 1562 having condemned the prevailing style of Church music, Palestrina was invited to assist in reforming it. He had already published (1554) his *First Book of Masses*, which marked him as the greatest composer of his day, and in 1565 he produced the famous *Missa Papæ Marcelli*, one of the most beautiful and most solemn compositions ever devoted to the service of the Most High. In 1571 Palestrina returned to the Capella Giulia, and afterwards took charge of the choir at the Oratory of Philip Neri. In 1586 Pope Sixtus V. desired to appoint him

master of the pontifical choir, but the bungling of the then occupant of the post frustrated the Holy Father's designs, greatly to Pulestrina's vexation. He died in Rome on February 2nd, 1594.

Paley, FREDERICK APTHORP, classical scholar, was born at Easingwold, near York, on January 14th, 1815, and, after being educated at Shrewsbury and St. John's College, Cambridge, resided for some time at the university. In 1846 his conversion to Romanism gave a check to his college career and until 1860, when he returned to Cambridge, on the partial removal of his disabilities, he was engaged in private tuition. He was thus mainly occupied for the following fourteen years when, in 1874, he was appointed classical professor in the Roman Catholic College established in Kensington and, on the failure of this institution, became classical examiner to the University of London and the Civil Service Commission. Owing to the weakness of his lungs he was compelled to move to Bournemouth (1881) and died at Boscombe on December 9th, 1888. The great work of his life was textual criticism, which he applied to *Æschylus*, *Sophocles*, *Euripides*, *Theocritus*, *Propertius*, *Hesiod*, *Martial*, and parts of *Homer* and *Aristophanes*. But he was a man of versatile taste, deeply interested in such diverse subjects as earthworms, ecclesiastical architecture, botany and geology. Thus, in addition to his editions of the classics, he also wrote (among other books) *A Manual of Gothic Mouldings* (1845), *Manual of Gothic Architecture* (1846), *A Few Words on Wheat-eels* (1859), *Flora of Peterborough* (1860), and *The Habits, Food and Uses of the Earthworm* (1878).

Paley, WILLIAM, archdeacon, was born at Peterborough, England, in July, 1743. He received his schooling at Giggleswick and, going to Christ's College, Cambridge, came out senior wrangler. Becoming a fellow and tutor, he lectured for eight years on mental philosophy, thus laying the foundations for his great work. After holding various small charges, he became archdeacon of Carlisle in 1782. His *Principles of Moral and Political Philosophy* first appeared in 1785, Milliken, a Carlisle bookseller, having the courage to give £1,000 for it, and was at once adopted as the text-book for ethics at Cambridge. The *Horæ Pauline* followed in 1790. In 1792 he brought out what he thought his best book, *Reasons for Contentment*, a caution against the prevalent Revolutionary principles. Two years later he produced his *View of the Evidences of Christianity*. He had now been made a prebendary of St. Paul's and rector of Bishopwearmouth and sub-dean of Lincoln. His last ten years were spent in composing, amidst broken health and zealous parochial labours, the work upon which his fame chiefly rests, his *Natural Theology, or Evidence of the Existence and Attributes of the Deity collected from the Appearances of Nature*. This saw the light in 1802 and he died in Lincoln on May 25th, 1805. As a writer his distinguishing notes are common sense, sanity and clear exposition. As a man he was of a happy and genial disposition, presenting many points of resemblance to Sidney Smith.

Palgrave, SIR FRANCIS, historian, was the son of a Jewish stockbroker named Meyer Cohen, and was born in London in July, 1788. He assumed the name of Palgrave on his marriage in 1823, when he also changed his faith. He was educated privately and called to the Bar in 1827. He published his *Itine and Progress of the English Commonwealth* in 1832, being knighted in the same year. He also wrote various other valuable historical books and edited many works for the Record Commission. In 1838 he was appointed Deputy-keeper of the Records, in which capacity he issued twenty-two interesting and valuable annual Reports. He published in 1851 (and later years) his *History of Normandy and England*. He died at Hampstead on July 6th, 1861.

Palgrave, FRANCIS TURNER, poet and critic, eldest son of the preceding, was born at Great Yarmouth, Norfolk, on September 28th, 1824, and was educated at Charterhouse and Balliol College, Oxford, becoming a fellow of Exeter College in 1847. From 1840 to 1855 he was vice-Principal, under Frederick Temple, afterwards Archbishop of Canterbury, of Kneller Hall, a Government training college for teachers at Twickenham. On the discontinuance of the college he entered the Education Department, where he remained till his retirement in 1884. His *Passionate Pilgrim* appeared in 1858, and in 1861 was published the book by which he is most widely known, an anthology of the *Golden Treasury of English Verse*. He edited several other volumes of extracts from the poets, and in 1885 was elected to the chair of poetry in Oxford University, vacated by the death of John Campbell Shairp. *Landscape in Poetry*, a selection of his lectures, appeared in 1897, in which year he died on the 24th of October.

Palgrave, WILLIAM GIFFORD, second son of Sir Francis Palgrave, was born at Westminster on January 24th, 1826, and educated at the Charterhouse and Trinity College, Oxford, where he graduated with distinction. Obtaining a commission in the Bombay Native Infantry he subsequently became a Roman Catholic, joined the Jesuits and was ordained a priest. After further study at Laval and Rome he was sent at his own wish as a missionary to Syria, where he acquired an intimate knowledge of the language and habits of the Arabs, and without difficulty was able to pass for a native. Barely escaping from the massacre of Syrian Christians he reported to Napoleon III. the causes of the persecution. In 1862-3, disguised as a physician, he undertook an adventurous journey across Central Arabia, partly to learn the possibility of obtaining pure Arabian bloodstock for breeding purposes, and his experiences are told in his *Narrative of a Year's Journey through Central and Eastern Arabia*. Mission work in Arabia proving impracticable, he quitted the Jesuits. Entering the English diplomatic service he was sent to Abyssinia, in July, 1865, to obtain the release of Consul Cameron and his fellow captives. In 1868 he married Katherine, daughter of G. E. Simpson, of Norwich. After holding several Consular appointments he was made British minister to

Uruguay in 1884 and died at Monte Video on September 30th, 1888. A great linguist (he acquired Japanese colloquially in two months) he came under the spell of Eastern religious thought, but three years before his death he was reconciled to the Roman Catholic Church.

Palimpsest. [PALÆOGRAPHY.]

Palinurus, a genus of Crustacea including the Spiny Lobster. It received its name from Æneus's crewman, who fell into the sea while asleep at his post.

Palissy, BERNARD, potter, was born at La Chapelle Biron, in the old province of Périgord, France, in 1510. By his own unaided efforts he acquired such a knowledge of natural science as was possible in his day and, having married, settled in Saintes to work at his father's craft of stained-glass painting. He spent sixteen years in finding out the process of enamelling, quite familiar (had he but known it) to the potters of Italy. At last he was successful and his vigorously-modelled specimens of earthenware found favour with Catherine de' Medici and the Court; but Palissy had adopted Huguenot principles, and so his business was ruined and he himself imprisoned. Charles IX. released him and gave him a plot of ground—afterwards the Tuileries—as a site for his works. In 1588, however, he again became the victim of fanaticism and even Henry III. was powerless to protect him. He was thrown into the Bastille, where he died, in 1589, before his execution could be carried out. In his pottery Palissy made very little use of the wheel, aiming at elaborate surface decoration in high relief, formed by pressing the clay into a mould. His best known pieces were vases, ewers, and large plates covered with figures of reptiles, crustaceans, fishes, plants and other objects, executed realistically and with remarkable spirit. He was also a writer of great merit, his autobiography being quite fascinating in its interest.

Paliyar, an outcaste tribe, occurring in Travancore and the Annamali Hills. South India. They

are amongst the most degraded of the aborigines of India, and are of dark red-brown colour, lank hair, scant beard and savage aspect. They speak a rude dialect of the Malayalim (Dravidian) language, and the name of which there are numerous variants (Pulayer, Puliyar, Pulay, Polayer, etc.) is derived from a Dravidian root—*pulu*—meaning "foul." They are demon-worshippers and omnivorous feeders, but otherwise a harmless, inoffensive people, monogamists, and great hunters,

entrapping the tiger or attacking him with poisoned arrows. Till a comparatively recent period those of Travancore, numbering about 200,000, were much oppressed by the higher castes, restricted as to dress, compelled to speak of themselves as slaves and to conform to other vexatious regulations.



PALISSY WARE: THE TEMPERANCE DISH, FROM THE PEWTER PLATEAU BY FRANÇOIS BRIOT. (DIAMETER 20 INCHES.)

Palladio, ANDREA, architect, was born at Vicenza, Italy, on November 30th, 1518, and devoted himself as a youth to sculpture, which he abandoned for architecture. His genius brought about a reaction against the Gothic style, and he had the ability to adapt ancient forms to

modern requirements. The churches of St. Giorgio Maggiore, Il Redentore, and part of the Doge's palace at Venice, and many palaces and villas in northern Italy, are his chief works. His treatise on *Ancient Monuments* is very valuable, but his great work, *I Quattro Libri dell' Architettura* (1570), effected a revolution in taste throughout Europe and, in his honour, a style of architecture, based on the old Roman, was named Palladian. He died at Vicenza on August 15th, 1580.

Palladium, anything which ensures (or is supposed to ensure) safety, the typical example being the institution of trial by jury, which is called the palladium of liberty, of the Constitution, etc. The Palladium was an image of the goddess Pallas (Athena), which secured safety to Troy until Ulysses stole it. Later the word came to be applied to any image or object regarded as of good omen and calculated to afford protection and defence. Possession of the Trojan Palladium was claimed by Athens, Argos, Rome, and other cities.

Palladium (chemical symbol, Pa; atomic weight, 106.6), a rare metallic element, which was first separated from native platinum by Wollaston in 1803 and named after the planet Pallas, which Olbers had discovered at Bremen in 1802. It occurs in nature in the free state, but not pure, being alloyed with platinum, gold, or iridium. In its general chemical properties it closely resembles platinum. It forms a series of salts, the palladiums and palladic compounds. It has a specific gravity of about 11.8. Neither the metal nor its compounds are much used. An amalgam of mercury is employed in dentistry and small quantities of the metal are said to improve the quality of steel for many purposes.

Pallas. [ATHENA.]

Pallas, PETER SIMON, naturalist, was born at Berlin on September 22nd, 1741, and was educated at the Universities of Berlin, Halle, Göttingen and Leyden. He early showed a strong bent for the study of natural history and was invited in 1768 by Catherine II. of Russia to fill the chair of natural history in the Academy of St. Petersburg. Next year he went with an expedition into Siberia to observe the transit of Venus, and until 1774 was engaged in a systematic investigation of the geography and zoology of Russia in Asia, extending his travels to the Chinese frontier. The results of his investigations appeared in his *Reisen durch Verschiedene Provinzen des Russischen Reichs* (1771-6). Catherine purchased his collection of zoological specimens. He travelled in South Russia in 1793-4 and went to live at Simferopol in the Crimea in 1796. He died at Berlin on September 8th, 1811.

Palliatæ, a group of univalve shellfish (Gastropoda) belonging to the suborder Opisthobranchia and including those members of this suborder having a well-developed mantle. The Sea-Hare (*Aplya*) and the Bubble-shells (*Bulla*) are the two best-known representatives.

Palliser, WILLIAM, inventor of projectiles, son of Wray Palliser, was born in Dublin on June 18th, 1830. He was educated at Rugby, Trinity Hall, Cambridge and Sandhurst, entered the Army in 1855, and went to the Crimea, but saw no active service. He was aide-de-camp to Sir William Knollys at Aldershot; in 1860 he went to Dublin, and in 1868 was married to Anne, daughter of George Perham. Retiring from the Army in 1871 he was returned as Conservative M.P. for Taunton in 1880 and died on February 4th, 1882. While an undergraduate he studied projectiles and shot of his design were tried at Shoeburyness when he was only twenty-three. In 1862 he took out patents for "improvements in the construction of ordnance and in the projectiles to be used therewith," and for screw-bolts, and in 1863 for chill-casting projectiles whether iron or steel, the great value of his invention being only slowly recognised. Besides other inventions he made proposals to defend London with a chain of unrevetted earthworks with similar works at the chief strategical points between the coast and the

capital, a suggestion which was partly adopted. For his public services he was made C.B. in 1868 and knighted in 1873.

Pallium, in Roman antiquities, a large rectangular cloak, characteristic of philosophers; in ecclesiology, a vestment made of wool (typifying the pastoral office) worn by patriarchs, metropolitans, and certain bishops. The original form was a rolled mantle worn as a scarf round the neck, the ends falling in front and behind. In the Greek Church it became a wide scarf, the end of which nearly reached the feet. In the Roman Catholic Church it gradually took a different shape and is now a narrow band passing round the shoulders, with a short vertical piece falling down the middle of the breast, and the same down the middle of the back. It is ornamented with crosses. Since the 6th century it has been customary for the Pope to bestow the pallium on metropolitans outside of his own diocese as a mark of particular favour. A bishop elected or translated to a metropolitan see begs the Pope for the pallium and receives it after taking an oath of allegiance to the pontiff. The Pope dons it whenever he officiates, but archbishops wear it only on certain great festivals.

Palm, JOHANN PHILIPP, bookseller, was born in 1768 at Schorndorf. While Germany was overrun by the French in 1806, Palm, who was in business in Nuremberg (his home, 29, Winklerstrasse, is one of the notable houses of the town), sent an anonymous pamphlet, *Deutschland in seiner tiefsten Erniedrigung* ("Germany in her deep humiliation"), to a bookseller of Augsburg. Some of Napoleon's officers brought it under his notice and the Emperor, determined to stop the issue of any patriotic pamphlets reflecting on his policy and the conduct of his army, ordered Palm to be arrested. He was taken to Braunau, tried by court-martial, and shot on 25th August, 1806. This crime infuriated the citizens whom Napoleon had been anxious to conciliate and Germany looked to the King of Prussia to relieve her of the tyrant.

Palma, capital of the island of Majorca and of the province of the Balearic Islands, belonging to Spain, 130 miles S. by E. of Barcelona. Built in the form of an amphitheatre it occupies a fine site on the south-western coast. A mole half a mile in length enables vessels of large size to discharge cargoes and is commanded by a fort. The cathedral, begun in 1230 and completed in 1610, is a fine Gothic building, with a graceful spire. The Exchange (1426) has even greater merits, and among other interesting old structures are the Governor's palace, the General Hospital, the town-hall, and the various colleges. Palma is the centre of administration and the seat of a bishopric. A railway connects it with the chief places on the island. The port does a brisk shipping trade, coastwise and foreign, in fruit and general goods and has some shipbuilding. Pop. (1900), 63,937.

Palma, or SAN MIGUEL DE PALMA, one of the Canary Islands, lying to the extreme N.W. of the group. It occupies an area of 718 square miles, is

33 miles long by 15 miles broad, and has the volcanic peak of Muchachos (7,740 feet) in the centre. From the vast crater of the Caldera, nine miles in diameter, a ravine runs towards the sea. The steep sides of the mountains are densely wooded with timber, which is used for shipbuilding, and the lower districts about the coast produce wine, sugar, almonds, fruits, honey, wax. Fish also abounds. Santa Cruz is the capital (pop. 7,383). Pop. of island (1900), 41,994.

Palma, JACOPO, painter, called PALMA VECCHIO, to distinguish him from his grand-nephew, Palma Giovane (1544-1626), a distinctly inferior artist, was born at Serinalta, near Bergamo, Italy, in 1480. He began to paint early under the influence of the Bellini but, coming to Venice, is said to have been taught by Titian. His best works are "The Three Graces" in the Dresden Gallery, and six devotional pictures in Santa Maria Formosa at Venice. He died about 1528, though some authorities make the date twenty years later.

Palmaceæ, a well-defined order of spadicifloral Monocotyledons called by Linnaeus "the princes of the vegetable kingdom," and comprising over 1,000 species, chiefly natives of the tropics. They have mostly cylindrical unbranched stems, bearing a tuft of large, often gigantic, leathery leaves at the top, the leaves being torn into segments either palmately or pinnately arranged. The flowers are either bisexual or unisexual, and are borne on a spadix which is often branched and is enclosed in a membranous spathe. There is a somewhat inconspicuous greenish perianth of six leaves in two whorls, six stamens, usually three carpels, and only a single albuminous seed with a small embryo. In some cases, as in *Chamerops humilis*, the only European palm (occurring in countries bordering on the Mediterranean), the stem is short; in others, as in the rattans, it is slender, or even climbs by hooked prickles. The leaves are sometimes scattered and in most cases have a fibrous sheathing base to the leaf-stalk. The terminal leaf-bud is the "cabbage" which, in some species, is eaten. The fruit varies very much, being either a nuculane with a hard seed, as in the date, drupaceous (but syncarpous and with a fibrous mesocarp), as in the cocoa-nut, or covered with woody reflexed scales, as in the sago-palm. The perisperm of the seed is generally hard and oily, as in the "flesh" of the cocoa-nut; but that of the

date, which is mainly cellulose, and that of the vegetable-ivory are still harder. The uses of palms are innumerable. Beams, veneers, canes, thatch, fibre for cordage and matting, fans, hats, bowls, spoons, sago, sugar, wines, spirits, food, oil and wax, are only some among the number. The date, and the areca-, cocoa-, coquilla- and corozo-nuts are treated separately. *Elais guineensis* is the African oil-palm, *Sagrus Rumphii* the chief of the East Indian sago-palms; the genus *Calamus* yields rattan-canes, and *Caryota* palm-wine and Indian gut.

Palmer, a pilgrim who had returned from the Holy Land and, as a token that he had fulfilled his vow, brought back with him the branch or leaf of a palm to be laid on the altar of his parish church. The word was also used of the itinerant monks who wandered from one shrine to another under a perpetual pledge of poverty and celibacy. The badge of the palmer was the scallop or cockle shell, the device of St. James, which was usually worn in the hat or other headgear. The words "palmer" and "pilgrim" are often employed as if they were interchangeable. Strictly speaking, however, a pilgrim is one who is still "outward bound" and has not yet achieved the object of his journey.

Palmer, EDWARD HENRY, Orientalist, was born at Cambridge on August 7th, 1840, and educated at Perse Grammar school in his native town. He evinced a great aptitude for languages, and whilst following the uncongenial occupation of a merchant's clerk contrived to pick up several tongues, including Roman, Italian, and French, all of which he spoke fluently. Returning to Cambridge in 1859, he was led into Oriental studies, making such progress that he was admitted to St. John's College and ultimately elected fellow (1867). In 1869 he took part in the Palestine Exploration Fund's survey of Sinai and, in the following year, he was employed with Charles Francis Tyrwhitt Drake in surveying Sinai and the adjoining desert, tramping 600 miles between Sinai and Jerusalem and acquiring marked influence over the Bedouins, amongst whom he was known as Abdallah Effendi. The result of his travels appeared in *The Desert of the Exodus*. Returning to residence in Cambridge, Palmer was appointed Lord Almoner's Professor of Arabic in 1871 and had to lecture not only on Arabic but on Persian and Hindustani as well. His chief academic works were a *Grammar of the Arabic Language* (1874), a *Concise Dictionary of the Persian Language* (1876), *The Poetical Works of Beha-ed-din Zohair of Egypt, with a Metrical Translation* (1876-7) and a translation of the Koran (1880). He had been called to the Bar in 1874 and occasionally went on circuit. In 1881 he gave up his lectures, retaining only his professorship and, taking to journalism, joined the editorial staff of the *Standard*. In 1882 Government asked him to go to Egypt and use his influence in pacifying the Bedouin tribes around Suez. Whilst engaged in this service he and his companions were murdered at Wady Sudr on August 11th, 1882. His remains and those of his fellow victims, Captain William John Gill, R.E., and Lieutenant



PALM.

Harold Charrington, were brought to England next year and buried in St. Paul's Cathedral on the 6th of April.

Palmer, SAMUEL, painter, was born in London on January 27th, 1805, and educated by his father (a bookseller) and at Merchant Taylors' school. He began as a child to show a talent for painting and exhibited in the Royal Academy at the age of fourteen. Ill-health having compelled him to leave London he settled for several years in Kent, where he devoted himself to water-colour painting with great success. In 1832 he made a sketching tour in North Wales, which he repeated in later years, paying visits to Devonshire as well, always in search of subjects. Having, in 1837, married Hannah, the eldest daughter of John Linnell, the couple went to Italy, where they resided for two years. After his election as an associate of the Society of Painters in Water-Colours (1843), Palmer ceased to exhibit at the Royal Academy and the British Institution. His circumstances, however, still continued straitened and during several years he gave lessons in drawing. In 1851 he was elected a full member of the Water-Colour Society. In 1863 he removed to Redhill, where he accomplished the finest of his works, the water-colour drawings in illustration of Milton's *L'Allegro* and *Il Penseroso*. He also became extremely partial to etching and produced many beautiful plates. He died at Redhill on May 24th, 1881. As a painter of idyllic English country scenes Palmer takes rank with the greatest masters.

Palmerston, HENRY JOHN TEMPLE, VISCOUNT (an Irish peer), statesman, was born at Bramlands, Romsey, Hampshire, on October 20th, 1784. Educated at Harrow, Edinburgh (where he boarded with Dugald Stewart), and St. John's College, Cambridge, he decided on following a political career. He had succeeded to the title on his father's death in 1802. After twice unsuccessfully contesting the University of Cambridge, Palmerston finally obtained, in 1807, a seat for Newport, Isle of Wight. He at once became a Junior Lord of the Treasury in the Tory Ministry of the Duke of Portland, and two years later was appointed Secretary-at-War, retaining this post till Canning's death in 1827, though he did not enter the Cabinet until just before that event. After clinging for a few months to Lord Goderich and the Duke of Wellington, he finally went into Opposition along with Huskisson. He now felt himself more closely drawn to the Liberals than to the Conservatives and in 1830 took charge of the Foreign Office under Lord Grey. One of his earliest strokes of policy was the creation of the kingdom of Belgium, with Leopold of Coburg at its head. He next used his best endeavours to suppress the Carlists of Spain and he vigorously supported Turkey against Russian aggression. He resumed office in 1835—Sir Robert Peel had been Premier for four months (December, 1834, to April, 1835)—and during the following years his policy was directed to counteracting Russian influence in the East of Europe and checking Mehemet Ali's schemes. From 1841 to 1846 he was once more in Opposition.

He was admitted with some reluctance to his old position in Lord John Russell's Administration and supported the premature risings in Italy and Hungary; but in 1851 his irresponsible approval of the *coup d'état* compelled his retirement from office and he never resumed his control over foreign relations. In 1853 he accepted the Home Office and on Lord Aberdeen's resignation undertook to form a Ministry. From 1855 to his death, he was at the head of affairs, except during a few months of 1858-59, when his complaisance to Napoleon III. as regards Orsini's conspiracy rendered him unpopular. He died almost suddenly at Brocket Hall, Hertfordshire, on October 18th, 1865. Lady Palmerston—sister of Lord Melbourne and widow of Earl Cowper—whom he married in 1839 and to whom much of his success was due, survived her husband four years. He was not a great statesman, but a cheerful, optimistic man of the world, with a thorough knowledge of human nature, fond of work and with a will to have his own way which brought him more than once under the censure of Queen Victoria. The speech of his life was that made (1850) in the Don Pacifico debate (he had been blamed for coercing Greece to compensate George Finlay and Pacifico for injuries), in which he delivered his famous "civis Romanus" protest on behalf of the rights of British citizens and triumphed over the combined forces of the Tories, Protectionists, Peelites and Radicals, who were also backed by the support of *The Times* and the foreign diplomatists.

Palmistry, the pretended art of foretelling a person's fortune by the lines, marks, and other characteristics of his palm. It is an ancient form of divination, having been practised among the Hindus, while it was not unknown to the Greeks and Romans. The hand has been duly charted and "mounts" and "lines" of various significance have been formulated. The lines and mounts no doubt exist in every hand, but it does not follow that they afford to the palmist exceptional facilities for divining the future or reading the past. While some amusement has been extracted innocently enough from palmistry, designing persons have turned it to account as a means of obtaining money illegally. All such fortune-tellers are liable to prosecution by the police.

Palm Oil, a vegetable oil which is imported in very large quantities from West Africa, where it is obtained from the fruits of the oil-palm, *Elæis guineensis*. The fruits are crushed and boiled with water; the melted fatty matter rises to the surface and is skimmed off. It forms a dark yellow solid of a buttery consistency, slightly lighter than water (specific gravity, .945) and possessing a peculiar odour. Chemically it consists chiefly of palmitin, i.e., a compound of palmitic acid and glycerine, mixed with a little olein. It may be purified somewhat and bleached by exposing it to a current of steam. It is used in the localities where it occurs as a substitute for butter; in Europe it finds much application in the manufacture of candles and soaps, and as a lubricant for heavy machinery, e.g., axles of railway trains, etc. From

the enormous amount of oil brought down the streams of Nigeria to the Gulf of Guinea the rivers were once collectively known as the Oil Rivers and the Niger Coast Protectorate (till 1893) as the Oil Rivers Protectorate. The "palm oil" of colloquial speech refers, of course, to the palm of the hand and is a significant phrase for bribery in which the palm of the bribee is "oiled" or "greased."

Palm Sunday, the Sunday before Easter, on which Christ's entry into Jerusalem, when palm branches were strewn before Him, is commemorated. In former times and in some countries it was celebrated by a procession the central figure of which represented Jesus riding on an ass. Many churches are decorated with palm branches on this day, and in countries where these cannot be procured the boughs of other trees, such as the willow, are allowed to be used in their stead. Originally the branches were blessed in the church and afterwards borne in procession by the worshippers.

Palmyra (Hebrew, *Tadmor*, "city of palms"; Modern Syriac, *Tidmir*), a ruined city of Syria, situated 135 miles N.E. of Damascus, at one of the rare oases in the great Syrian Desert. The date of its formation is uncertain. It rose very early to wealth and importance, as the majestic remains of temples, tombs, and dwelling-houses testify. The grandest of these monuments, dedicated to Bel, or the Sun god, still retains 60 of its 390 columns. The city reached the height of its prosperity during the wars of Rome with Parthia and Persia; but it lost some of its independence in spite of the gallant struggles of Zenobia, after whose defeat (A.D. 272) Aurelian destroyed and depopulated her capital. The Saracens in 740 completed the work of devastation, to which earthquakes have also contributed. It was not until 1678 that the site was discovered by European geographers.

Palpitation, the feeling of distress which is associated with excited action of the heart. In many instances this symptom is occasioned by digestive disturbance. It occurs also as a result of the immoderate use of tobacco, in anæmic conditions, and in Graves's disease. It may be due to disturbed action of the heart consequent upon disease primarily affecting that organ.

Palsy. [PARALYSIS.]

Paludan-Müller, FREDERIK, poet, son of Bishop Jens Paludan-Müller, was born at Kjørtedinde in Finn, on February 7th, 1809. Educated at the Cathedral school of Odense and the University of Copenhagen, his first poem *Four Romances* appeared in 1832, followed by a romantic comedy *Love at Court*. *The Dancing Girl*, 1833, a poetical romance, assured his position and attracted general attention. His next works, showing the influence of Byron, were not so successful. During 1838 and 1840 he travelled in Germany, Italy (where he wrote *Venus*, a lyrical poem of great beauty) and France, and his genius developed. In 1841 he began to publish *Adam Homo*, a narrative satirical poem, the typical classic of Danish poetry. It was not completed for seven years, during which he produced

shorter works of exquisite beauty, *Tithonus*, 1844, being deemed the most perfect. His later works include *Kalanus*, a noble philosophic tragedy, wherein Greek culture and Hindu religion are contrasted, and *Adonis*, a welcome to death, which, with *Adam Homo*, are considered his finest productions. One of the greatest Danish authors, the poet lived a retired life on the outskirts of Fredensborg and in Copenhagen where, after a long illness, he died on December 27th, 1876.

Paludina, the typical genus of the family Paludineæ, one of the best-known groups of pond-snails. They belong to the sub-order Prosobranchiata, and appeared in Upper Jurassic times. The Purbeck marble and the Petworth marble from the Wealden beds of Sussex are both made up in the main of *Paludina* shells; the latter is generally familiar from its use for fonts.

Pamir, an elevated region of west central Asia, a continuation westwards of the highlands of Tibet. It is the converging point of the Hindu Kush, Karakorum (Himalaya), Kuen-lun, and Tien Shan mountain systems and, from its lofty surface, has been called the Roof of the World. It forms the south-east of Russian Turkestan. It is mostly drained by the Amu-Darya or Oxus, whose chief head-waters—the Murghab and Panj—find their sources at a great altitude in the plateau. Its highest points are Mustagh Ata (25,800 feet) on the eastern limits, and Mount Kaufmann (23,000 feet) of the Trans-alaï range towards its northern confines. The Pamir has a general elevation of from 13,000 to 15,000 feet and, where it is habitable, is mainly occupied by Kirghiz tribes.

Pampangas, a numerous people of Luzon, Philippine Islands, chiefly settled on the great Pampanga plain, north-west of Manila. Formerly their domain reached to Manila Bay itself, but here they have been either exterminated or absorbed by the Tagalogs, whom they resemble in appearance and usages, and even in speech, both speaking dialects of the Malayo-Polynesian language. The Pampangas are the most warlike of all the Luzon tribes, but were reduced, after a stout resistance, by the Spaniards in 1570. At that time a few were Mohammedans, but the great majority Pagans; at present nearly all are Roman Catholics. Their numbers are estimated at 338,000.

Pampas, vast plains of South America, more especially those extending through central and southern Argentina, from the Rio Negro northwards to the region of Gran Chaco and from the Andes to the Atlantic. They are mostly quite level, excepting for an occasional tree, and are covered with grass which furnishes food to immense numbers of cattle, horses and sheep. The wild animals are principally the viscacha, rheu (American ostrich) and deer. The pampas are represented in the north of the continent, particularly in the valley of the Orinoco and Venezuela, by llanos or steppes.

Pampeluna, or PAMPLONA, the capital of Navarre, Spain, on the Arga, 200 miles N.E. of Madrid. The principal buildings are the citadel (on a rock

1,000 feet high), the Gothic cathedral, the old churches of San Saturnino and San Nicolas, the municipal buildings and the noble aqueduct by which drinking water is conveyed to the town. The bull-ring is one of the largest in Spain. The manufactures include textiles, leather, paper, soap, earthenware, flour and iron. The town was rebuilt in 68 B.C. by Pompey the Great, from whom it derived its name of Pompeiopolis, or Pompaelo, whence the present form. Captured by the Goths in 466 and the Franks in 542, it was dismantled by Charlemagne in 778, but repulsed the Saracens in 907. It was fortified and adorned in the Middle Ages. In the Peninsular War the French held it from 1808 till 1813, when it was taken by Wellington. In the first Carlist war it was occupied by the adherents of the Queen Mother Christina (1836-40) and in the second rising (1872-6) the Carlists attacked but failed to capture it. Pop. (1900), 30,609.

Pamphlet, a short literary work consisting of one or more printed sheets stitched together, but not bound, sometimes with a paper wrapper. The news-books of the 16th and 17th centuries containing news-bulletins and verses on topics of the day were called pamphlets. Political pamphlets were much commoner than they are now before the development of the daily newspapers. Among the most famous pamphlets were John Milton's *Areopagitica* (1644), on behalf of freedom of printing, Edward Sexby's *Killing no Murder* (also attributed to Silius Titus), directed at Oliver Cromwell (1657), Daniel Defoe's *Shortest Way with the Dissenters* (1702), a sarcastic performance that brought him to the pillory, and, in later times, Sir Rowland Hill's *Post Office Reform* (1837), W. E. Gladstone's *Vatican Decrees* (1874), and R. A. Cooper's *Free Railway Travel* (1891).

Pan, in Greek mythology, was the god of the country, and in later times of all nature, and his parentage was ascribed to Hermes, Zeus, or Apollo, and Callisto or Enoe. He was represented as possessing the lower limbs of a goat, horns on his head, and half-human features. His voice inspired terror; hence the derivative "panic." Arcadia was the chief seat of his worship, and there he was supposed to wander on the mountains in the company of the nymphs and satyrs, playing on the pipes and dancing. Prophetic powers were attributed to him, and he promoted the fecundity of the flocks and herds. Elizabeth Barrett Browning contributed a poem, "The Great God Pan," to the first volume of the *Cornhill* magazine, then edited by W. M. Thackeray, which was illustrated by a drawing by Lord Leighton, representing the conventional Pan playing the pipes which were named Panpipes after the god.

Panama, a republic of South America, bounded on the N. by the Caribbean Sea, on the E. by the republic of Colombia, on the S. by the Pacific, and on the W. by Costa Rica (Central America). It measures 350 miles in length, from 40 to 120 miles in width, and occupies an area of 31,600 square miles. Physically it is an isthmus connecting North and South America. Its Atlantic coast-line

is 420 miles long, whilst that on the Pacific side extends for 650 miles and includes the fine bay of Panama. A mountainous ridge of no great elevation runs through the centre, parallel with the coasts, and forms the watershed of the Chagres river, flowing north, and the Rio Grande, flowing south. In the west of the isthmus are the masses of the Cordillera of Veragua (Dome of Santiago, 9,270 feet) and the Sierra de Chiriqui (the volcano of Chiriqui, 11,266 feet). The flat country near each shore is marshy and very unhealthy, but produces an abundance of tropical fruits and vegetables. Cotton, indiarubber, and tobacco, vanilla, sarsaparilla, etc., are exported. The chief cities besides Panama, the capital, are Colon (Aspinwall), the Atlantic port, Santiago, Penonomé, and Los Santos. Pop. estimated at from 230,000 to 300,000. The ISTHMUS is practically identical with the state, though the name is sometimes made to embrace the isthmuses of Darien and San Blas. Its breadth from Colon to Panama is about 40 miles, and a railway connecting these two points was completed in 1855 by an American company. The idea of a CANAL was mooted as early as 1520, but it was not until 1875 that any practical steps were taken. Four years later Ferdinand de Lesseps threw his energies into the languishing project, and in 1880 the first Panama Company was floated for the purpose of constructing a sea-level canal. After conducting operations for several years—the administration being characterised by such gross extravagances and corruptions that de Lesseps and others were tried and convicted in 1893, the sentences however being soon remitted—the company went into liquidation in 1889. A second company being formed, a lock canal was decided upon, but the difficulties of the enterprise were so great that, in 1902, the proprietary rights were offered to the United States for forty million dollars. Provided the title were clear, the United States Senate passed an act authorising the purchase. Colombia objecting, the then department of Panama in 1903 cut the Gordian knot by seceding and forming an independent republic, which was recognised by the United States. The French company having been bought out, arrangements were made for the construction of the canal by an American company. The canal will be 46 miles long and 30 feet deep, with a width at the surface of 124 feet and at the bottom of 72 feet. It is expected to be open for traffic within the second decade of the 20th century. Estimating the French losses at over £80,000,000 and the American outlay at £40,000,000, the canal will cost more than £120,000,000. Vasco Núñez de Balboa, Governor of Darien, with a party of which Francisco Pizarro was one, was the first European to cross the isthmus and to sight the Pacific.

Panama, capital of the republic of the same name, is situated on the bay of Panama, on the south coast of the isthmus. The city was founded in 1518, and is the oldest European settlement in America, but few traces of the old Mauresque Spanish architecture remain. It is a bishop's see. The cathedral dates from 1760, and was much injured by earthquake in 1882. Among other edifices are the residence of the president, the House

of Assembly, a college, and the Convent of the Conception. The harbour is safe, but ships of any draught have to anchor three miles from the quay. Yellow and malarial fevers are deadly scourges which can only be got rid of, or at all events reduced in severity, by the adoption of up-to-date methods of sanitation, including an efficient drainage system. Pop. estimated at 30,000.

Panchatantra, the oldest collection of moral stories and reflections in Sanskrit literature. It was composed by a Brahmin named Vishnuserman, consists of five books which have for their object the formation of character and the guidance of conduct, and was primarily intended for the instruction and enlightenment of young princes and others likely to have authority over their fellows.

Pancras, St., or **PANCRA TIUS**, a Roman youth of noble family who suffered martyrdom under Diocletian about A.D. 304, at the age of fourteen. In early times he shared with St. Nicholas the patronage of boys, and is still often regarded as the patron-saint of children. His day is May 12th. He is usually represented trampling on a Saracen and bearing either the martyr's palm or a sword or stone. The well known railway terminus in London bearing the name of St. Pancras (belonging to the Midland Railway Company) was so named from the circumstance that it stands in the parish of St. Pancras.

Pancreas. The pancreas is a gland which is situated in the abdominal cavity in close relation with the duodenum; the pancreatic duct discharges its contents into that portion of the small intestine some two or three inches from the pyloric end of the stomach. The pancreas is a long narrow structure having an expanded head at its right extremity. It presents some resemblance, when examined microscopically, to a salivary gland. (For the function of the pancreatic juice in digestion, see **DIGESTION**.)

Panda (*Ailurops fulgens*), the single species of the genus *Ailurops*, of the Raccoon family. It is found at heights of from 7,000 to 12,000 feet in the south-eastern Himalaya. It is little larger than a cat, has pointed prominent ears, slightly retractile claws and plantigrade feet, a feature which gives it a bear-like tread and assigns it a place near the bears among the Carnivora. It is, however, a vegetable feeder and its habits are partially nocturnal. The fur is reddish-brown, and the long tail is ringed with yellow and red.

Pandora (Greek, "the all-endowed"), according to Greek mythology, the first mortal woman ever created. Zeus, to punish Prometheus for stealing fire from heaven, induced Hephaestus (Vulcan) to make a lovely female figure of clay, which was then endowed with life and loaded with gifts from all the gods. Lastly, Zeus himself gave her a box as a dowry, and sent her to Prometheus for a wife.

The latter was too shrewd to be taken in by the artifice; but Epimethus, his brother, yielded to Pandora's charms. No sooner was the box opened than all the ills that have since plagued mankind escaped from it and spread over the world, hope alone being still left at the bottom, presumably to "spring eternal in the human breast."

Pandours, an irregular force organised for protecting the frontier districts of Hungary from the incursions of the Turks. More particularly, the name was applied to the force raised on his own estates in Croatia in 1741 by Baron Trenck to clear the adjoining country of Turkish robbers and brigands. At a later date the force was enrolled as a regiment of the Austrian army. Their brutality, under Trenck, was such that they were both dreaded and detested throughout Germany, the name of Pandour becoming a synonym for a wantonly cruel Croatian soldier. Dr. J. A. H. Murray maintains that there is no foundation whatever for the alleged derivation of the word from Pandur or Pandeir Pusza, a village in Lower Hungary.

Pangenesis, a hypothesis put forward by Charles Darwin in 1868 in his *Variation of Plants and Animals under Domestication* to explain the facts of heredity. It supposes all the cells of an organism to throw off inconceivably minute gemmules, which multiply by self-division and are capable of developing into cells similar to those from which they are derived. By mutual affinity these gemmules are collected into the sperm-cells and germ-cells of the organism, so that the offspring of the union of sperm and germ combines gemmules from all parts of each parent's body. A large number of gemmules are supposed to be transmitted in a dormant state to future generations, thus explaining the phenomena of reversion or atavism. This hypothesis has been opposed by that of Herbert Spencer of physiological units, and by Professor Weismann's hypothesis of "the continuity of the germ-plasm."

Pangolin, a mammal belonging to the Edentate genus *Manis*, with several species, from the Oriental and Ethiopian regions. They are long slenderly-built animals, with short limbs, and covered with imbricated scales generally brown in



PANGOLIN.

colour, whence they are called scaly ant-eaters. They can roll themselves into a ball, and the scales pointing outwards form an efficient protection.

Panipat, an ancient ruined city in the Karnal district of the Punjab, India, 53 miles N. of Delhi. Its origin is traced to the mythical period of the Mahabharata; but in more modern times it is celebrated as the scene of three battles that were turning-points in Indian history—namely, Baber's victory over Ibrahim Lodi, ruler of Delhi, in 1526, Akbar's final assertion of Mogul power in 1556, and the blow that was dealt to the Mahratta supremacy by Ahmed Shah Durani, of Afghanistan, in 1761. The modern town, standing high on the old bank of the Jumna, with the *debris* of former buildings at its foundation, is a poor and squalid place. Pop. estimated about 30,000.

Panizzi, SIR ANTHONY or ANTONIO, chief librarian of the British Museum, was born at Brescello, in the province of Emilia, Italy, on September 16th, 1797, and was educated at a school in Reggio and the University of Parma. He graduated in law in 1818 and practised as an advocate. Implicated, however, in revolutionary movements, he had to escape from the Continent, and, coming to England, settled as a teacher in Liverpool in 1822. An introduction to Brougham led to his appointment as Italian professor in University College, London (1828) and, later, as assistant-librarian in the British Museum (1831). He was appointed Keeper of Printed Books in 1837 and, in this capacity, superintended the removal of the library from Montague House to its new quarters and undertook to catalogue the whole of the contents, a gigantic task in which he was hampered by want of funds and trained assistants. His greatest achievement perhaps was the design of the reading-room (which, in his sketch, had a flat roof instead of the striking dome actually chosen) and its annexes. This was opened in 1857, the year before he became principal librarian. He was a great administrator and insisted on the first place being assigned to the library. It was through his offices that, in 1846, Thomas Grenville bequeathed his library to the Museum. He was strongly in favour of the removal of the natural history collections. "He would," Lord Macaulay said, "give three mammoths for one Aldus." Before his retirement in 1866 the Museum officials were recognised as civil servants, a reform which he advocated. He was made K.C.B. in 1869 and died in London on April 8th, 1878.

Pannonia, a province of the ancient Roman Empire, lying south of the Danube and north of Dalmatia and Moesia Superior, and corresponding to South-west Hungary and parts of Lower Austria, Styria and Carniola, with Croatia and Slavonia. It was first subjugated in A.D. 8, and the legionaries stationed there rebelled in 14 and were quelled by Drusus. Under Trajan the province was divided into Pannonia Superior and Pannonia Inferior. Diocletian substituted a fourfold division including Valeria and Suavia. Vindobona (Vienna) was the chief city of Upper Pannonia, and Sirmium (Mitrovicza) in Lower Pannonia often served as a residence

of the later emperors. The Huns wrested the province from Theodosius; it was afterwards overrun by Ostrogoths, Longobards, and Avars. Charlemagne subdued the Avars about 798 and after his death the Slavonians subdued the country and in the 9th century it was occupied by the Magyars or Hungarians, who, in 1000, established their kingdom under the rule of Stephen, who converted the people and was afterwards created a saint.

Panorama, a painting of a complete scene viewed from a central point or made continuous upon an unrolling canvas. The former variety is very popular, verisimilitude is given by introducing lay-figures, etc., in the foreground, the spectator standing on a central platform some little distance from the canvas. Among first-class examples of this kind may be cited "Bannockburn" by Fleischer of Munich, exhibited in Glasgow (1888); the "Bataille de Champagne" by Alphonse de Neuville and Edouard Detaille, shown in Paris (1881); the "Bombardement de Paris" and "Défense de Paris aux Champs Elysées" by Félix Emmanuel Henri Philippoteaux, exhibited in Paris, and "Niagara," exhibited in Westminster (1890). As to panoramas on moving canvas—which have almost wholly gone out of fashion—the best work was done by William Roxby Beverley (1814-89), the well-known scene-painter of Drury Lane. One of his finest series were the views of the Trossachs produced in connection with James Anderson's revival of *Rob Roy* in 1874.

Panslavism, a movement for the political union of all Slavonic nationalities under the leadership of Russia or a re-united Poland. The agitation arose in the first half of the 19th century, the first Panslavist congress being held at Prague in Bohemia in 1848. Deep-rooted distrust of bureaucratic Russia and all its ways, however, in course of time damped the enthusiasm of the adherents in the movement in which now only academic interest is felt.

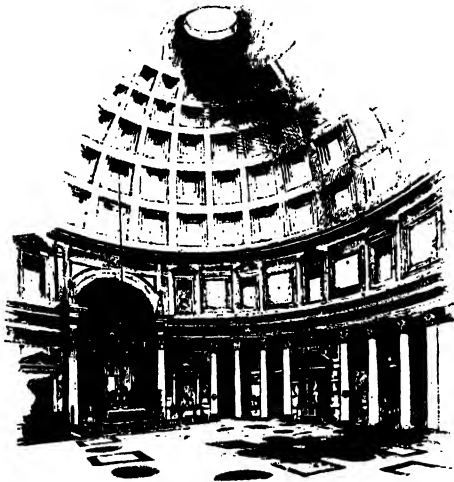
Pansy (from the French *pensée*, "thought"), one of many popular names for *Viola tricolor*. As Ophelia says in *Hamlet*, "And there is pansies—that's for thoughts." Milton, in *Lycidas*, speaks of "the pansie streaked with jet." Other names are Heart's-ease, Love-in-idleness (1 *Midsommer Night's Dream*, act ii. sc. 2), and Three-faces-under-a-hood. This species, of which the cultivated varieties are endless, is remarkable for the large, pinnately-lobed stipules to its leaves, the varied colours belonging both to the xanthic and the cyanic series, combined in its petals, and the absence of the cleistogamous flowers which are present in the violet. *V. tricolor* is a common weed in cultivated ground.

Panthay (PANSI), the collective Burmese name of the Mohammedans of Yunnan, South-west China. It is either derived from *Pan-tai* = "oldest people," "aborigines," or is a corrupt form of *Parsi*, a term still often applied to the Moslem population of India. They are the Hwai-tze of the Chinese, and claim Arab descent, although they migrated in the 17th century from North China (Kan-su and Shensi) to Yunnan. Their features often betray both Arab and Tatar characteristics, and as a rule

they are much taller, stronger, and more vigorous than the Chinese proper. The name is now commonly applied to all Chinese Mohammedans, who number altogether about 20,000,000.

Pantheism, the theological and metaphysical doctrine that God is one and the same with the sensible and material universe, and consequently impersonal; in other words, that God is everything and everything is God. Though the word is modern—John Toland (1670-1722) is said to have first used the form "Pantheist" in 1705—the belief is very ancient. It permeates Brahminism and was taught by many of the Greek and Alexandrian philosophers. Benedict Spinoza (1632-1677) was the greatest of modern expounders of the system.

Pantheon, a temple or other sacred building dedicated to all the gods. The most famous is the Pantheon in Rome, built in 25 B.C. by Augustus's

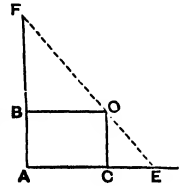


INTERIOR OF THE PANTHEON, ROME.

minister, Agrippa. It is a circular domed structure, with an octastyle portico of Corinthian columns. In consequence of its plan being circular it has also been called the Rotunda. Since 609 it has been used as a Christian Church, being dedicated to the Virgin Mary and all the martyrs, and bearing the name of Santa Maria Rotonda. It is one of the finest and best-preserved relics of antiquity. In modern times the purposes of a pantheon came to be modified and it may accordingly also be described as a building reserved for honouring a nation's illustrious dead, who are either buried within its precincts or commemorated within its walls. Thus the Panthéon of Paris (originally the Church of Saint Génévieve) now bears on its façade the inspiring legend AUX GRANDS HOMMES LA PATRIE RÉCONNAISSANTE.

Panther. [LEOPARD.]

Pantograph is an instrument for reproducing a drawing on a different scale from the original. A very usual form of it consists of four rods, A F, A E, O B, O C, jointed at B A C O. Points E and F are chosen (according to the requirements of the drawing) such that E O F is a straight line. The point o is fixed and, however the parallelogram may be moved, the ratio of o E to o F is unaltered, since it is equal to the fixed ratio E C / C A. If a pointer be fixed at E and made to travel over a drawing, a pencil at F will trace out an exactly similar drawing, the linear dimensions of the two drawings being in the ratio of E o / o F. The pantograph was invented about 1631 by C. Scheiner.



Pantomime, originally a stage-player who acted in dumb show; then a drama acted in dumb show; now a theatrical entertainment (performed during the Christmas season) consisting of two parts—the first a burlesque of some popular fable, and the second the tricks of the clown and pantaloons, and dancing of harlequin and columbine; the second part, or harlequinade, being ushered in by a transformation scene. In the early pantomime the harlequin played a prominent part and continued to be a leading character until the appearance of Joseph Grimaldi as clown in *Mother Goose* at Covent Garden in 1806. Grimaldi's performance overtopped everything, and since his day the clown has been accepted as the hero of the rough-and-tumble of the harlequinade.

Paoli, PASQUALE DE [PASCAL], patriot, was born at Rostino in Corsica on April 25th, 1725. In 1738 he went into exile with his father to Naples, where he received a military education, and served with distinction in Calabria. Returning to his native land in 1755, he was chosen generalissimo in the struggle first against the Genoese and then against the French. The latter, under Count Vaux, utterly defeated the patriots in 1769, and Paoli escaped on board an English frigate, France in the meantime having annexed Corsica as compensation for the expense she had been put to in reducing it. The patriot came to London in September, 1769, and during his residence in England was awarded a pension of £1,200 a year by the Government. He also made many friends, Dr. Johnson, Sir Joshua Reynolds, Oliver Goldsmith, and Edmund Burke being among their number. After the French Revolution Paoli accepted the governorship of Corsica under the Republic, but in 1793-4 rose, with British aid, against the Convention. The French were driven from the island, of which George III. became sovereign on June 17th, 1794. Paoli being disappointed of the vicerealty, returned to London in 1795 and, in the following year, the British abandoned the island in consequence of the general disaffection to their rule. Paoli remained in London till his death on February 5th, 1807.

Papa, originally in Greek and Latin meant simply "father" (the child's attempt to say

"pater"), latterly became specially addressed to spiritual fathers. In the West it was at first applied to bishops, but gradually was confined to the Pope (the bishop of Rome). In the East its use has always been more general, and it is even given to the inferior clergy. It is interesting to observe that the efforts of the early Christian missionaries in the Orkneys and Shetlands so impressed the natives that they named several of the islands after the sacred office, as Papa-Stour (Shetland) and Papa-Westray (Orkney).

Papagos (PAPAHOTAS), an Indian people of North Mexico, about the head of the Gulf of California, between the Altar and Gila rivers. They are of Pima stock, very tall and vigorous, with fair complexion, no darker than that of South Europeans. The Papagos are chiefly stock-breeders and fishers, of peaceful disposition, and strict monogamists, treating their women with great respect. Many migrate periodically across the frontiers, seeking employment in the mining districts of Arizona, where the United States government has assigned them a reservation 120 square miles in extent. They number altogether about 5,000 and are all nominally Christians.

Papaveraceæ (so named by A. L. de Jussieu in 1789), the poppy tribe, a natural order of Thalamifloræ containing about 100 species in nearly twenty genera. They are sometimes shrubs, but mostly herbs with abundant milky or coloured latex of a narcotic character. The leaves are scattered and exstipulate; sepals, two and caducous; petals, usually four and hypogynous; stamens, numerous; fruit, dry and usually capsular, with numerous seeds on parietal placentas. Besides the genus *Papaver*, the order includes the *Celandine* and the Californian *Eschscholtzia*.

Papaw (*Carica Papaya*), a tropical South American tree, the type of a small calycifloral order (*Papayaceæ*). It seldom exceeds twenty feet in height or a foot in diameter, and is often hollow. It bears scattered leaves on horizontal stalks often two feet long, and themselves sometimes two feet across and deeply seven-lobed. The flowers are dioecious and pentamerous, and the gourd-like fruit is about ten inches long, melon-shaped or oblong, and of an orange colour. It is edible, but when ripe is seldom eaten raw. The whole plant contains an acrid milky juice, and possesses the remarkable property of rendering meat tender. It contains an essential principle, papain, analogous to the animal ferment trypsin, and is successfully employed in dyspepsia, diphtheria, etc.

Paper, a tissue composed of a compacted web or felting of vegetable fibres usually in the form of a very thin flexible sheet. The materials used for the best qualities are cotton and linen rags, but the substances most commonly employed are wood-pulp (chiefly from the conifers) and esparto grass. The materials, whatever they are, must first of all be reduced to pulp and are then treated by a marvellous machine which, receiving the raw article at one end, delivers the finished goods at

the other. From the vat at the initial stage, in which it is kept agitated, the fluid pulp flows over a wire-gauze frame, passes to the couching rolls where the moisture is squeezed out of it, proceeds to rollers where it undergoes further pressure, travels to the smoothing rolls or damp calenders where both surfaces are rendered smooth and the marks of the wire and felt obliterated, is conveyed to the drying cylinders and thence to the calenders where surface gloss is imparted, and finally goes to the cutting and trimming appliance where the web is divided into widths and cross-cut into the sheets of the desired size. Some of these continuous paper-making machines are 100 feet long and 10 feet wide, require a building to themselves and turn out a web seven feet wide. Webs of almost incredible length have been produced for newspapers, one, shown at the Edinburgh Exhibition in 1886, measuring five miles long, and another, exhibited at Pittsburgh, fourteen miles. The kinds of paper ordinarily made are news and printing papers, writing papers, packing papers, miscellaneous (copying, cigarette, blotting, and the like), and millboard and card-board. Some paper for particular purposes (bank-notes, *éditions de luxe*, and so forth) is yet made by hand, principally in Holland, Italy and Scotland. The manufacture arose in the East, probably first of all in China, where the mulberry, bamboo, and certain grasses were utilised. But the word "paper" itself indicates its more immediate though still remote origin, since it is almost a transliteration of the word *papyrus*, the reed growing in the Nile, which was the material universally employed by the old Egyptians for writing. It is fortunate that it was discovered that vegetable fibres could be turned to account, since the supply of linen and cotton rags is altogether inadequate to meet the world's demands. Had the latter substances continued to be the only materials practicable, linen and cotton would need to be manufactured to satisfy the want, with the inevitable result that paper would have remained a comparatively costly article, and the output of books and other publications been seriously affected. Esparto and wood-pulp have averted such a calamity.

Paper Nautilus, a cephalopod belonging to the sub-order Octopoda, and of interest inasmuch as the females have a delicate, one-chambered shell. This is secreted by two of the arms which are expanded into a membranous plate and which are closely attached to the hinder part of the body; the shell is therefore "pedal," and not, as in ordinary shell-fish, "pallial"—i.e., secreted by the mantle. The Paper Nautilus lives on the open seas in the warmer parts of the world, and it was believed to use the two expanded arms as sails; the fact that the shell is keeled further helped to this delusion. The only fossil forms occur in the Pliocene deposits. The generic name is *Argonauta*.

Paphos, the name of two cities in the south-west of Cyprus. At Old Paphos (modern, Kouklia), situated about two miles from the coast, was a celebrated temple of Aphrodite, who, according to Homer, landed here after she sprang from the foam, and who is hence often called the "Paphian

goddess" or "queen." At New Paphos (now Baffo), which originally was the port of the older town, St. Paul preached and struck blind Elymas the sorcerer. It was the residence of Sergius Paulus, the proconsul of Cyprus, whom the apostle visited and converted on his first missionary journey.

Papias, Bishop of Hierapolis in Phrygia, Asia Minor, suffered martyrdom at Pergamum about the year 162. Between 140 and 150 he put together a collection called *Expositions of Sayings of the Lord*, fragments of which are preserved in the *Historia Ecclesiastica* of Eusebius. They appear to have been founded on oral tradition derived from the daughters of Philip the Apostle and from Polycarp, who had been a disciple of St. John.

Papier-mâché (French, "mashed or pulped paper"), a material consisting of paper-pulp pressed or moulded into various shapes which, after special treatment, resembles either varnished wood or plaster. In Persia and Cashmere this art has long been in use and decorated trays and boxes are the articles chiefly made. In Japan armour and helmets were fashioned by gluing together sheets of flexible paper pressed while in a damp state upon moulds. In the 18th century the art was introduced into Europe and the Oriental manufactures were imitated in France and Germany. Papier-mâché snuff-boxes made by a coach painter named Martin became popular and specimens of his work are sought after by collectors. Henry Clay, of Birmingham, in 1772 patented a method of preparing papier-mâché for coach doors, cabinets, screens, tea trays, and the like, and this is still retained for the finest work. It consists of specially prepared sheets of paper soaked in a strong size of paste and glue, pressed in a mould, dried and hardened by dipping in oil, then trimmed, japanned, and ornamented. In 1845 C. F. Bielefeld patented a process for adapting papier-mâché to internal architectural decoration. Ceramic papier-mâché, patented in 1858, is a composition used for architectural enrichments, for masks, dolls' heads, etc. Common kinds of papier-mâché are now made of Swedish wood-pulp, old waste paper re-pulped and mixed with glue and paste to which ground chalk, clay, and fine sand are added. Papier-mâché is decorated in various ways with painted flowers and landscapes, with ornaments in leaf-gold, and inlaid with thin plates of mother-of-pearl shell and metal designs, the surface being covered with a protecting varnish.

Papilionaceous, or BUTTERFLY-LIKE (from the Latin *papilio*, "a butterfly"), is the term applied to the corolla characteristic of the Papilionaceæ, a sub-order of the order Leguminosæ, including all the British species of peas, vetches, clovers, etc. Such a corolla consists of five petals, the odd posterior one, known as the standard or vexillum, being generally relatively large, erect, and exterior. It overlaps two lateral petals, the wings or alæ; and they in turn overlap the two anterior and generally horizontal keel-petals or carinæ, which are often confluent towards their apices. The petals have

claws, are curiously interlocked or modelled over one another, and often differ in colour. The species are found throughout the globe and are estimated at nearly 4,800 in number. In some the flowers are extremely beautiful, in others the medicinal virtues they possess give them special value, while still others are of the first importance as regards both their economic uses and their worth as articles of diet.

Papilionidæ, a family of butterflies in which all three pairs of legs are perfect. It is divided into two sub-families, the Pierinæ and Papilioninæ. The best-known species are the wood-white, the white cabbage butterflies, and the swallow-tailed butterfly.

Papin, DÉNIS, physicist, was born at Blois, département Loir-et-Cher, France, on August 22nd, 1647. He studied medicine at Paris and practised as a physician before turning his attention to science, but was compelled to leave France on account of his Protestant opinions. After living some years in England, where he was intimate with Boyle, on whose nomination he was elected a Fellow of the Royal Society, he was in 1687 appointed professor of mathematics at Marburg. In 1696 he removed to Cassel where he carried on experiments for several years, one of which culminated in his attempt, in 1707, to sail to London by way of the Fulda, the Weser, and the North Sea in a puddle-boat of his construction. He had reached Münden when the vessel was destroyed by some watermen who foresaw that it threatened to ruin their trade. Papin died in England, probably in London, about 1714. Besides being the inventor of a machine for raising the temperature of water above 212° F. (which is called by his name and known as his digester), he improved the air-pump, and was probably the first to construct a steam-engine.

Papineau, LOUIS JOSEPH, statesman, was born in Montreal, Canada, on October 7th, 1786. In 1809 he was elected a member of the Legislative Assembly and, being an eloquent man of fine presence, was soon recognised as the leader of the French-Canadian majority which dominated the popular House, the English-speaking minority controlling the Government. He was elected Speaker of the Assembly for Lower Canada in 1815, a post which he held for twenty-two years. By his violent attacks he brought the Governor-General into the arena of politics and so fair-minded a man as Lord Dalhousie declined to confirm his election in 1827. His supporters protested that confirmation was only a matter of form. Lord Dalhousie prorogued the Legislature, but by the next session he had returned to England and Papineau was again chosen. No French-Canadian ventured to oppose him. He became a despot and, in the season of his supremacy, even contemplated the founding of a Canadian nation. He opposed the union of Upper and Lower Canada, and in the Ninety-two Resolutions of 1834 formulated demands which were carried by a large majority. His supporters resisted immigration as certain to increase the British element, and they were opposed to responsible

government and favoured an elective legislative council, which would place the British in a permanent minority. The Imperial Government intervened and Papineau began an active campaign against Great Britain. Revolutionary cries and flags heralded *La Nation Canadienne*. Sir John Colborne, a courageous soldier, dealt vigorously with the rebels, and Papineau retreated to the United States. In 1838 a proclamation was issued (and rescinded the same year) threatening him with death if he returned to Canada. Papineau, however, withdrew to Paris, and only returned from exile, pardoned, in 1847. He found his countrymen enjoying power under the very union he had opposed and that he had outlived his influence. His last years were spent in retirement, and he died on April 2nd, 1871.

Papinianus, **ÆMILIUS**, jurist, was probably of Syrian origin and was born in the reign of Antoninus Pius (138-161). He studied law under Særvola along with Septimius Severus, afterwards Emperor, whose friendship he enjoyed and under whom he became *magister libellorum* and praetorian prefect (205). He accompanied the Emperor on his expedition to Britain in 208 and was commended to the care of his sons by Severus, who died at York in 211. This charge Caracalla carried out by first of all murdering his brother and co-regent Geta, and then massacring Geta's friends (amongst whom was Papinianus) in 212. Papinian ranks with the greatest expounders of Roman law. His chief works were several books of *Quæstiones* (193-198) and *Responsa* (198-211), besides two books of *Definitiones* and treatises *De Adulteris*.

Pappenheim, **GOTTFRIED**, **GRAF ZU**, general, came of an ancient Swabian family, whose head was hereditary Marshal of the Empire, and was born at Pappenheim in Bavaria on May 29th, 1591. He was educated at Altdorf and Tübingen and, becoming a Roman Catholic, threw himself with fervour into the campaigns conducted on behalf of his Church. He first took service under the king of Poland, but made his reputation by his cavalry charges in the Thirty Years' War. To him the early victory of Prague (1620) was mainly due, and the suppression of the Austrian peasants' rising of 1626; but his rashness was more than once fatal to Tilly, and his religious zeal led to the cruel sacking of Magdeburg in 1631. He did good service under Wallenstein at Lützen (1632), where he was mortally wounded, but lived to hear of the death of Gustavus Adolphus, surviving until the 17th of November, the day after the battle.

Pappus, a circlet of hairs taking the place of the limb of the calyx in many Composite and some allied orders of plants. In the dandelion it is stipitate or stalked, being carried up on a tubular prolongation of the receptacle. In the salsafy it is sessile. In the former case the hairs are unbranched or pilose; in the latter and in thistle-down, they are feathery or plumose.

Pappus of Alexandria, a mathematician who lived probably in the 3rd (or possibly the 4th) century after Christ, was author of a *Synagoge*, or

Collection, from which most of our knowledge of Greek geometry is obtained. The work contains theorems, some of which were worked out by Pappus himself, but its interest is mainly historical, since it gives an account of the principal researches of his predecessors and notes elucidating the chief mathematical discoveries made before his time.

Papuans, collective name of the Eastern or Oceanic division of the Negro race, separated by the Indian Ocean from the western or African division. The word is derived from the Malayan *papuwah* ("frizzly"), in reference to the "mop-heads," which are highly characteristic of all the



NEW GUINEA PAPUANS.

(Photo. kindly supplied by New South Wales Government.)

dark Oceanic peoples. In its widest sense, the term "Papuan" comprises the Papuans proper of New Guinea and neighbouring islands; the so-called "Alfuros" or Western Papuans of the Malay Archipelago, between New Guinea and Floris; the Melanesian or Eastern Papuans, between New Guinea and Fiji, and south to New Caledonia; the Negritoes of the Philippines, Malay Peninsula, and Andaman Islands; the extinct Tasmanians and the Australian aborigines, of aberrant type.

[AUSTRALIANS, MELANESIANS, NEGRITOE.] Owing to long contact especially with the Malays and Indonesians (Brown Polynesians), even the Papuans proper must now be regarded as an extremely mixed race almost everywhere, except in the interior of New Guinea and the other larger islands, where the original type has been preserved in comparative purity. In general this type is of a less pronounced Negro character than that of the African division. The colour is somewhat lighter, the hair is never woolly in the strict sense, but always frizzly; the nose is much larger, rather arched than depressed, with a downward tip at the base; the lips are much thinner and less everted; the cheek-bones are less prominent, the jaws less prognathous, and the features altogether less coarse and softer; lastly, the stature is considerably shorter, averaging about five feet—a little more in the men and a little less in the women. The Papuan is, therefore, a Negro toned down, so to say, the modified forms being probably attributable to the different climatic conditions—marine in the east, continental in the west. In speech there is no kind of resemblance, the less so that many Papuans (especially the Melanesian branch) have for ages spoken Malayo-Polynesian dialects of even more primitive form than those of the modern Malays and Polynesians themselves. The true Papuan languages, such as those of the interior of New Guinea and of the Aru Islands, have scarcely yet begun to be seriously studied; but enough is known of their structure to separate them altogether both from the Malayo-Polynesian and from the African linguistic families. The Papuans resemble the African blacks perhaps more in their mental than in their physical qualities. Both are equally excitable, laughter-loving, boisterous, and improvident; both good agriculturists (the plantations on parts of the New Guinea seaboard are models of their kind) and endowed with considerable artistic taste, as shown especially in their wood-carvings; both also cruel, indifferent to human suffering, and pronounced cannibals, at one time perhaps universally, even still to a large extent. On the other hand, the Papuans are no believers in witchcraft, and altogether less superstitious, but more treacherous, owing probably to the prevalence of the vendetta. Their social organisation also is less developed, and although certain individuals may enjoy more or less influence due to their personal qualities, there are no tribal chiefs proper, either hereditary or elected.

Papules are minute prominences met with in some forms of skin disease. Some cutaneous affections remain papular throughout—e.g., lichen. In other cases the solid papule is the first stage in the development of what becomes a vesicle, and it may be finally a pustule. The hard, shot-like elevations met with in the early stages of small-pox are examples of this last-named variety.

Papyrus (from the ancient Egyptian *Papu*) is the Greek and Latin name of the sedge *Cyperus Papyrus*, probably the "bulrush" of the Bible, which, though used for boat-building, cordage, and sails, is chiefly interesting as one of the oldest of

paper-making materials. The plant is perhaps indigenous in Nubia and Abyssinia, but was largely cultivated in the Nile delta. Some Egyptian papyri date from upwards of 2,000 years B.C. The plant has a horizontal rhizome, which spreads in the mud, sending up stems eight to ten feet high. Of the tufted head nothing was made, since it was reserved for garlands for the shrines of the gods. Pliny describes how the paper was made from these stems by cutting them in longitudinal slices, placing them side by side with others across them, wetting them, beating them with a mallet, and then rubbing them smooth with ivory. It continued in use down to the 10th Christian century. The plant, extinct in its wild state in Egypt, grows wild near Syracuse, where it was probably introduced by the Saracens. There seems reason to believe that the "ark of bulrushes" in which the infant Moses was exposed among the flags in the Nile was constructed from the papyrus.



PAPYRUS.

Para, the southern estuary of the Amazon, Brazil, South America. The name was originally applied to the Amazon itself. It receives the river

Tocantins, is about 200 miles long, and has a breadth of from 12 to 40 miles. The bore of the Amazon is most usually noticeable in this arm, when the tide rises to high water a few minutes before new and full moons by a wave 15 feet high, followed occasionally by others, and rushes up the mouth with irresistible violence.

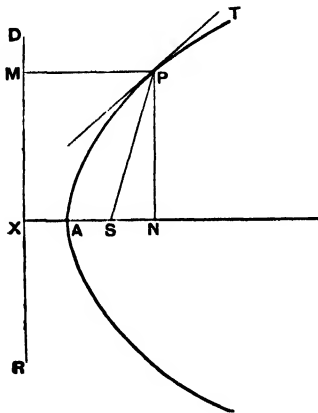
Para, or GRÃO PARA, an Atlantic state in the north-east of Brazil, South America. It occupies an area of 443,800 square miles, mainly covered with dense primeval forest. The state is bisected by the Amazon and watered by the many tributaries of that river, several of which afford communication with the interior. The principal products, all of which are articles of commerce, are rice, manioc, millet, cotton, sugar, rubber, cacao, vanilla, sarsaparilla, cloves, balsams, gums, medicinal plants, nuts and hides. Pop. estimated at 650,000.

Para, or BELEM, a seaport and capital of the state of Para, Brazil, South America, on the right of the estuary of the Para, 80 miles from the Atlantic. The chief buildings are the cathedral,

bishop's palace, college, museum, and library, and there is a good botanical garden. The harbour admits large vessels, and the town is the emporium of trade for the Amazon valley. Para is the largest rubber port in the world, and the leading vegetable products of Brazil are exported here. There is a railway to Bragança on the coast. Pop. (1900) estimated at 75,000.

Parable, an allegorical representation or story from which a moral is drawn. The parable is a fictitious story, but differs from the apologue in that it deals with events which might reasonably and naturally have happened. In the Bible it also means a proverb.

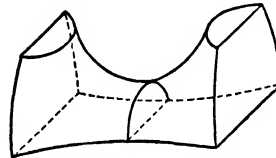
Parabola, the curve obtained when a cone is cut by a plane parallel to any one of its generating lines. If the plane pass through the apex of the cone, then the curve obtained will be simply one of the generating lines; hence a straight line may be considered as the limiting case of a parabola. Besides being regarded as the section of a cone, a parabola may also be defined as a curve such that the distance of every point on it from a fixed point (the focus) is the same as its perpendicular distances from a fixed straight line (the directrix). If S is the focus, DR the directrix, and SX perpendicular to DR , then A , the middle point of SX , is a point on the parabola, and is called the vertex. If P be any other point, and PM be drawn perpendicular to the directrix, then $\frac{SA}{AX} = \frac{SP}{PM} = 1$. The line AS produced is the axis of the parabola, and, since $\frac{SA}{AX} = 1$, it follows that the curve can only cut this axis again at a second vertex infinitely far off. The point halfway between the two vertices (the centre) is hence also at infinity, so that a parabola may further be regarded as an ellipse whose centre and second vertex are at infinity. Since all



diameters of a conic pass through the centre, the diameters of a parabola must meet at infinity—i.e., they are all parallel and parallel to the axis, the

latter being often called the principal diameter. If a tangent, TP , be drawn at P , the angle $TPM =$ angle TPS , and from this property follows a neat method of cutting out a parabola. Let a sheet of paper be taken with one edge quite straight, and a short distance from the centre of this edge let a small pin-hole be pricked. Let the paper now be doubled over so that the edge crosses the pin-hole in any direction. After repeating this for a number of directions and firmly pressing down the paper each time, it will be found that the creases trace out a parabola; they are, in fact, so many tangents, and if a good number have been made the curve can be easily cut out. If PN be the perpendicular from P to the axis it can be proved that $Px^2 = 4AS \cdot AN$. This gives the equation of a parabola as $y^2 = 4ax$, the vertex being taken as origin, and AS produced as the axis of x . All curves whose equations are of the form $y^n = bx^m$ are known by the general name of parabolas, the curve $y^3 = bx$, for example, being called the cubic parabola.

Paraboloid, a solid figure in which parabolic sections can be cut. If a parabola be rotated about its axis, it will give the paraboloid of revolution, the sections at right angles to the axis being



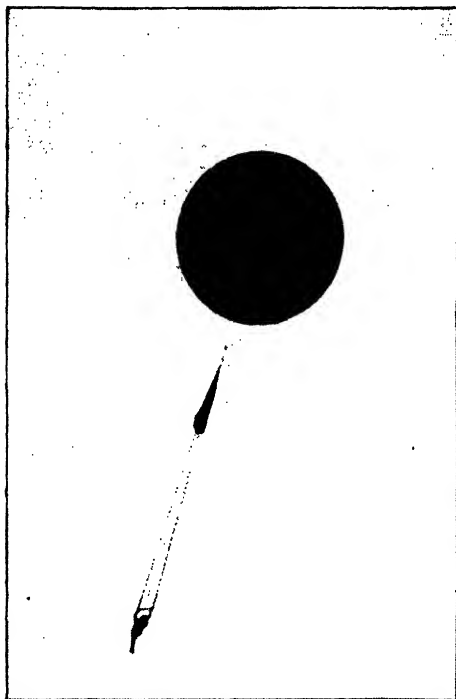
HYPERBOLIC PARABOLOID.

circles. Should these sections be ellipses instead of circles, we have the elliptic paraboloid. A more complicated surface is the hyperbolic paraboloid, the sections in planes parallel to two pairs of axes being parabolas, and those in the plane containing the third pair of axes being hyperbolas. The surface so obtained is saddle-shaped, and extends to infinity in the direction of each of its axes. Although so curiously curved, it is possible to draw straight lines upon it; hence it is called a ruled surface, and may be constructed by suitably arranging a number of stretched strings.

Paracelsus, whose real name was THEOPHRASTUS BOMBASTUS VON HOHENHEIM, physician and chemist, was born at Einsiedeln, in the canton of Schwyz, Switzerland, on December 17th, 1493. After leaving Basel University, he studied chemistry and alchemy with Bishop Trithemius of Würzburg, and afterwards made practical observations in the mines of Tyrol. After wandering all over the Continent he settled at Basel, in 1526, as town physician, having acquired a great medical reputation. In two years' time, however, he left the city, having made enemies by his personal peculiarities, as well as by lecturing in German (instead of the orthodox Latin) and by expressing contempt for Galen and other traditional medical authorities. For the rest

of his life he roamed from town to town in the south of Germany, finally settling in Salzburg, in Austria, where he died suddenly on September 23rd, 1541. Numerous works were attributed to him for many years after his death, but of these only a small number are now considered genuine. His *Practica* was printed at Augsburg as early as 1529. By many Paracelsus has been regarded as little better than a quack. More probably his only fault was that he was one of those great original thinkers and observers who are in advance of their time.

Parachute, an apparatus for enabling a person to descend safely from a balloon, though fatal accidents have sometimes arisen in consequence of



AEONAUT ABOUT TO DESCEND FROM BALLOON.

the appliance refusing to act at the necessary moment. The parachute is usually in the form of an umbrella, with a diameter of between twenty and thirty feet. The resistance of the air first opens the parachute, on to which the aeronaut hangs below, and then checks its descent.

Paraclete (Greek, *paraklētos*, "advocate"), originally meant one called in to aid, intercede for or defend in a legal case. Then it came to mean more particularly an advocate, the man retained professionally to undertake such a duty. Finally, the word was applied in the New Testament to the office of the Holy Ghost as the Comforter, and is

now wholly employed in this sense. In John's Gospel (xiv., 16) the word is rendered "Comforter" and in the first Epistle of John (ii., 1) "Advocate," the reference in the latter passage, however, being explicitly to Jesus. At an early period the Western Church adopted the translation "Advocate," which involved the idea of intercession, but early writers otherwise seemed to favour the rendering "Comforter" (*Consolator*).

Paradise, originally, an enclosure or park. Xenophon and other Greek writers employed the word (*paradeisos*) as an Eastern term descriptive of the parks of Persian kings and Oriental nobles. In the Septuagint the word was used of the Garden of Eden and in the New Testament for the abode of the Blessed. Since Paradise was the residence of man before his fall, and therefore, *ex hypothesi*, absolutely perfect, it was natural that earlier attempts to convey some notion of a heavenly state should appropriate not only the name, but ascribe to it figuratively some of the physical features of the garden which God planted in Eden (Genesis ii., 8-17).

Paradise, BIRDS OF. [BIRDS OF PARADISE.]

Paradise Fish (*Macropodus viridi-auratus*, Lac.), a Chinese fish, of brilliant coloration, which breeds readily in aquariums. The ventral fins and lobes of the tail are prolonged into filaments. The name is also applied to an allied species, *Asphromenus olfax*.

Paraffins (Latin, *parum*, little; *affinis*, like). The name paraffin was first given to a waxy substance which was obtained from the tar resulting from wood distillation. This substance, however, as well as certain liquids obtained naturally or by artificial means, was found to consist chemically of a mixture of hydrocarbons all intimately related to one another, to which the name was then given as a generic term. Hence the paraffins are hydrocarbons which may be represented by the general formula C_nH_{2n+2} . They vary considerably in characteristics, from the gas methane, CH_4 , to higher solid members in which the number of carbon atoms may be as many as sixty. They are all incapable of uniting directly with other substances to form addition-compounds, and are hence termed saturated compounds. They give rise, by substitution of hydrogen, to a very large number of compounds of different types, as acids, alcohols, etc. The paraffin wax and oil both consist of mixtures of these compounds. That used for illuminating purposes is a thin liquid obtained by the distillation of natural petroleum or from carbonaceous shades. During this process a number of oils are obtained, which have to be separated to some extent by fractional distillation. The more volatile portions, which are not suitable for illuminating purposes, are very largely employed as solvents for organic products—*e.g.*, caoutchouc, resins, etc. The next portion of the distillate is used extensively for lamps and as fuels. The higher boiling portions cannot be well used in lamps, but find application as lubricants, and to an extent also as fuel, while the last parts, which are solid at

ordinary temperatures, are employed in the manufacture of candles, usually mixed with stearin, as otherwise the candle would be too soft.

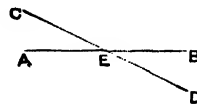
Paraguay, a South American republic, bounded on the N.W. by Bolivia, on the N.E. and E. by Brazil, and on the S.E., S., and S.W. by Argentina. The Paraguay, flowing from north to south, is not only the chief river, but bisects the country, the western section being a region of pampas known as the Gran Chaco, the eastern, the more important, being called Paraguay Oriental. It has an area of about 100,000 square miles. Discovered by Juan Diaz da Solis in 1515, it was further explored by Diego Garcia and Sebastian Cabot. The aborigines long resisted the Spanish, but by the middle of the 16th century Paraguay had become a province of the viceroyalty of Peru. Later the Jesuits arrived, and in the following century the whole administration of the country was given over to them, with the happiest results. In 1768, when they were expelled, Paraguay again came under the Spanish viceroys, until in 1810 it declared itself independent. From 1814 till 1840 the government was carried on by Dr. Francin, and from 1844 to 1862 by his nephew, Don Carlos Lopez. The latter's son, Don Francisco, perished in 1870 in the disastrous war with Brazil and the neighbouring states, by which the population of Paraguay was decimated. The northern part of the country consists of grassy plains, on which are many palm-trees, alternating with low ridges. In the fertile south are savannahs and rich marsh land, with some well-wooded hill country. The climate is temperate. In the north country grows the maté, or Paraguay tea-shrub; and indiarubber and dye-wood, oranges, several species of gums, cochineal, honey, and various medicinal plants are among the natural products. Maize, tobacco, rice, coffee, cacao, and the sugarcane are cultivated; and valuable timber is obtained from the forests. The chief industries are the cultivation of various economic plants of great value, such as the maté and tobacco; cattle-farming, of growing importance; fruit-rearing, especially oranges and pineapples; and timber-cutting. Tanning and the pottery manufacture are carried on by the natives, but trade in the towns is in the hands of foreigners. The religion of the country is Roman Catholic. Although education is compulsory and gratuitous, but a small proportion of the Paraguayans can read and write. At the close of the war a new constitution was enacted, by which the executive was given to a president elected for four years, and the legislative power was vested in two houses—a senate and a house of deputies. Asuncion (51,719), the capital, and Villa Rica (25,074) are the only important towns. Immigration from Europe has repaired some of the losses caused by the war, and the commerce of the country has greatly increased. The river Paraguay rises in the state of Matto Grosso in the west of Brazil, and thence flows southwards along the borders of Bolivia, through Paraguay, and into the Argentine Republic, where it becomes one with the Paraná. It enters the sea at Buenos Ayres after a course of some 1,500 miles. The Paraguay was declared

open to all nations in 1852, and is navigable by steamers as far as the mouth of the Cuyaba, one of its chief affluents. Pop. (1900), 635,571, including 100,000 Indians, mostly in the Gran Chaco.

Parahyba, an Atlantic state of Brazil, and bounded inland by the states of Rio Grande do Norte, Ceara, and Pernambuco. The surface, mostly elevated, occupies an area of 28,850 square miles. The chief rivers are the Parahyba and the Mamanguape. The principal products include cotton, coffee, cacao, sugar, rubber, drugs, timber and dye-woods. Cattle of European breeds are raised. Pop. estimated at 600,000.

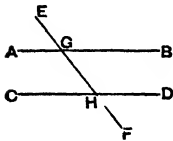
Parahyba, the capital of the preceding state, on the right bank of the Parahyba, near its mouth in the Atlantic. The lower town is the commercial quarter, and in the upper the principal buildings are the governor's palace, the arsenal, treasury, the Franciscan and other convents and churches. Its chief trade, conducted through its port, Cabedelo, consists of sugar, cotton and Brazil-wood. Many cotton plantations are in the vicinity of the town. Pop. estimated at 19,000.

Parallax is the apparent alteration in the position of an object caused by a change in the position of the observer. Thus, if an object at *E* be viewed from the point *A*, it appears to be in the direction *EA*; but if it be viewed from *C*, it appears to be in the direction *EC*. The angle *CEA* is the parallactic angle, and measures the amount of parallax. The determination of parallax is of great importance in astronomy. The places of the moon and planets seen from the centre of the earth are known as the true places of these bodies; but, since no observations can be actually made from that convenient point, corrections have to be applied to the observations made from the earth's surface. In the accompanying diagram let *E* represent a planet, *A* a point on the earth's surface, and *C* the centre of the earth. *AB* will be the arc of a great circle, and is called the diurnal or geocentric parallax. It is, of course, equal to the angle between *A* and *C* viewed from the planet. The diurnal parallax of a planet is greatest when the latter is on the horizon, and is then known as the horizontal parallax, this being equal to the angle which the radius of the earth subtends at the planet. A result of diurnal parallax is that the planets appear lower in the heavens than they really are; hence at rising they appear to the east of their true place, and at setting, to the west. The nearer a heavenly body is to us the greater is its parallax. The fixed stars, being so very far away, have no diurnal parallax, so that this phenomenon is limited to the sun, moon, and planets; but it was observed by the astronomer Bessel that the position of some of the stars did appear to alter at different times of the year—i.e., when viewed from different points of the earth's orbit. This alteration is known as the annual parallax of a star, and is equal to the angle



subtended at the star by a radius of the earth's orbit. To avoid any errors caused by this, it is found convenient to calculate the positions of the stars as though they were viewed from the sun and not from the earth. Hence this parallax is also known as the heliocentric parallax. In very few stars, however, has any annual parallax been observed, the greatest being that of the star α Centauri, and even in this case it does not amount to 1". This star has therefore been considered as the one nearest to the earth; but the distance is more than two hundred thousand times the earth's distance from the sun.

Parallel. In Euclidian geometry two straight lines are said to be parallel when they are in the same plane, and on being produced both ways, never meet. Modern geometry, however, prefers to consider that they meet at infinity. Euclid's theorems in his investigation of parallel straight



lines have been criticised by the ablest mathematicians, with the result that it has been found impossible either to prove or disprove the assertion that, "when two lines are cut by a transversal, if the alternate angles are unequal the lines meet." This was assumed as true by Euclid,

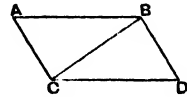
and from this it followed that if the lines are parallel the alternate angles are equal. If EGB and FHD be the transversal to the lines AB and CD , Euclid's assumption is that AB and CD will meet if EGB and FHD are not equal, or, as Euclid states it, if the sum of BGH and FHD is less than two right angles.

Parallelepiped, a solid figure, all of whose six sides are parallelograms, from which it follows that its edges consist of three sets of four parallel lines. Its three diagonals—the lines joining opposite corners of the figure—meet at a point and mutually bisect each other. The most commonly occurring form of parallelepiped is bounded by rectangular parallelograms, and is exemplified by an ordinary cigar-box; this is called a rectangular parallelepiped. Among crystals are found numerous examples of different parallelepipeds, calc spar, for instance, occurs naturally in that form of it which is known as a rhombohedron. When all the faces are squares, the parallelepiped becomes a cube.

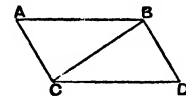
Parallel Motion was invented by James Watt as part of his steam-engine. In a beam engine the end of the beam moves in a circular path, while the piston-rod, whose motion must be transmitted to it, moves in a straight line. If the beam and piston-rod were connected by a single link, the horizontal component of the circular motion of the former would produce great pressure on the stuffing-box, and tend to bend the piston-rod. To overcome this, Watt connected the beam and piston-rod by three links pivoted together and to the beam, making a parallelogram of which one side was a portion of the beam, the piston-rod being pivoted

to one corner. By the addition of a "radius rod" pivoted to the lower corner of the parallelogram, and also to a fixed point on the framework of the engine, and by properly proportioning the lengths of the links, the piston-rod can be constrained to move in a straight line. Various parallel motions have been designed to suit different patterns of engines; but, as the beam engine is now practically obsolete, they are no longer required. Parallel motions are, however, used in some pieces of mechanism, such as the steam-engine indicator.

Parallelogram of Forces follows from Newton's second law of motion. If two forces acting at any point B may be represented in magnitude and direction by the lines BA , BD , and if the parallelogram $ABDC$ be completed, its diagonal BC will represent in magnitude and direction the resultant of those two forces. This proposition can also be deduced from the parallelogram of velocities, since a force is equal to the product of a mass and an acceleration, and an acceleration is the velocity generated per second.



Parallelogram of Velocities. If a body at B have a velocity represented by BA , it will travel over the distance BA in one second. Similarly, if it have a velocity represented by BD , it will travel to D in one second. If, however, the body tend to move with both these velocities at the same time, it will reach the point C at the end of a second, AC and DC being drawn parallel to BD and BA . Its path can also be shown to have been the diagonal BC ; in fact, the body moves exactly as though it had the velocity represented by BC . This can be experimentally illustrated by letting a marble move along a groove in the direction BA , while at the same time the board containing the groove is moved in the direction BD . The groove will then lie along DC , so that the marble will be at C . The proposition of the parallelogram of velocities can hence be stated in these terms:—If a body tend to move with two uniform velocities, which can be represented in magnitude and direction by the two sides of a parallelogram drawn through any point B , the resultant velocity will be represented by that diagonal of the parallelogram which passes through the point B .



Parallel Roads, a series of raised benches at different elevations, running round the head and sides of Glen Roy in Lochaber, Inverness-shire. They occur in similar situations elsewhere. In Glen Roy they are 1,140, 1,059 and 847 feet respectively above sea-level. They were the subject of much controversy until it was suggested by Dr. John MacCulloch (1773-1835)—in opposition to John Playfair's view that they were artificially

formed for purposes of irrigation—that the glen had been occupied by a lake, held up at what is now the open mouth of the valley by a barrier of glacier ice. As the ice thawed the level sank, and as it froze again the water was maintained at the fresh level for an unknown period. Then with another thaw and another re-freezing the third level was obtained. Finally when the barrier ice



PARALLEL ROADS OF GLEN ROY.

was completely thawed, the water escaped and the lake ceased to be, leaving only the glen and the parallel beaches around it as a memorial of what had been the physical features of the country in remote geological time. The roads have a very gentle slope from the mountain side and their width varies from three to 30 feet.

Paralysis. This is the term applied to the impairment or loss of the power of movement in muscles. Where there is only partial loss of power the condition is sometimes termed paresis. The inability to move a muscle may be due to disease affecting the muscle itself, or to interference with some portion of the nervous structures connecting the muscle with the central nervous system. The portions of the brain in which voluntary impulses causing the movement of muscles originate have been definitely mapped out. From the grey matter of the convolutions surrounding the fissure of Rolando, motor impulses descend, along what is known as the motor path, through the internal capsule of the corpus striatum, the crura cerebri, the pons Varolii, and the anterior pyramids of the medulla; at this point the fibres conveying the motor impulses cross over, certain of those which have been located on the right side of the brain being transferred and travelling downwards on the left side of the spinal cord and *vice versa*; this crossing over is known as the decussation of the pyramids. The motor fibres continue downwards mainly in the lateral columns of the cord, and ultimately break up into a network, which communicates with certain ganglion cells in the anterior horns of the grey matter of the cord. These ganglion cells are in communication by their processes with the fibres of the anterior or motor roots of the several spinal nerves, and down these nerves the

motor impulses pass, until they finally reach the peripheral nerve terminations in the muscles. The motor impulse thus starts in a ganglion cell in the grey matter of one side of the cerebral cortex, pursues its path through the brain on that side, traverses the spinal cord, in the majority of cases, on the opposite side, and reaches a second ganglion cell in the grey matter of the cord; from this second ganglion cell the impulse is transmitted through the motor nerve to the muscle. A lesion affecting any part of the motor path may produce muscular paralysis, and it may be observed that certain peculiarities in the distribution of the paralysis are manifested in correspondence with the portion of the motor path which is affected. In the pons and medulla and in the spinal cord, the motor paths of the two sides are near one another, and a lesion in these situations may produce paralysis affecting both sides of the body. In the cerebral hemispheres the motor paths are widely separated from one another, and it thus comes about that a lesion involving the motor path there, usually produces paralysis limited to one side of the body. If the motor path of the left cerebral hemisphere is involved, there will be paralysis of the right side of the body, this transference being, of course, due to the crossing over of the motor fibres already described as occurring at the decussation of the pyramids. Such a one-sided paralysis is called *hemiplegia*. In the spinal cord, on the other hand, a single lesion is likely to involve the motor paths conveying impulses to both sides of the body, and it must further be noted that only the muscles which are supplied by nerves leaving the cord below the seat of the mischief are involved. Thus, if the lesion be situated in the dorsal region of the spinal cord, the upper limbs will not be paralysed, only the lower extremities and parts of the trunk being affected. If the cervical portion of the cord above the origin of the nerves which go to form the brachial plexus be implicated, the muscles of the arms are involved, and if the disease extends as far upwards as the origins of the phrenic nerves, the diaphragm will be paralysed. Paralysis due to disease of the spinal cord, and affecting both sides of the body supplied by nerves taking origin from below the upper limit of disease in the cord, is termed *paraplegia*. In paraplegia the nerve centres in the lumbar portion of the cord are generally involved, leading to involuntary discharge of the contents of the rectum and bladder. When those portions of the central nervous system in which the motor tracts from both cerebral hemispheres lie in close proximity are involved by disease, *cross paralysis* is sometimes met with; for example, in disease of the pons Varolii, paralysis of one half of the body is sometimes accompanied by paralysis of the opposite side of the face. In one form of disease of the brain causing paralysis, the muscles affected are not limited to one side of the body; this *general paralysis* is almost always associated with insanity. The ordinary paralysis of cerebral origin is, as already remarked, hemiplegic in character, affecting the opposite side of the body to that in which the cerebral lesion is located. It may be noted, however, that it does not affect all muscles on the

paralysed side equally. The muscles of the eye, those of mastication, and those of the upper part of the face, for example, usually escape; neither are the muscles supplied by the vagus nerve nor those of the neck and trunk implicated. The muscles of the limbs are always involved, the lower extremity sometimes to a less extent than the upper. When paralysis is due to disease in the pons and medulla, the near neighbourhood of the nuclei of origin of certain important nerves is likely to cause special symptoms to be present; moreover cross paralysis is a common phenomenon, for the reason already noted. In the form of disease known as glossolabio-laryngeal paralysis, the nuclei of certain nerves taking origin from the medulla are particularly affected, with consequent paralysis of the lips, tongue, and muscles of the larynx. [For some account of the various forms of lesion which may affect the brain and spinal cord, producing hemiplegia or paraplegia, see BRAIN, SPINAL CORD.] Paralysis is in some cases due to the involvement of motor nerves themselves by disease, as, for example, in facial palsy (Bell's palsy), due to disease affecting the facial nerve. [NEURITIS.] Again, paralysis may be due to disease affecting the muscular tissue, as, for example, in what is known as pseudo-hypertrophic paralysis. It remains to be noted that paralytic symptoms are frequently met with in hysteria. *Paralysis agitans* is a form of paralysis which is accompanied by tremor and rigidity of muscles; the tremor is a more prominent symptom than the paralysis, the affected muscles manifesting involuntary rhythmical contractions, and the disease is thus sometimes known as "shaking palsy." Persons advanced in life are usually affected and the disease is of an eminently chronic character.

Paramaribo, capital of Surinam or Dutch Guiana, South America, on the left bank of the Surinam, a few miles from the river's mouth in the Atlantic. The town is well constructed, its Dutch characteristics—such as painted houses, canals, and numerous churches of Lutheran and Calvinistic bodies (the Moravian Brethren are very strong)—looking somewhat quaint in their tropical setting of orange and tamarind trees. It is the centre of the trade of the colony, sugar, rum, molasses, cacao and rubber forming the principal exports. The chief buildings are Fort Zeelandia (the Governor's residence), the Government House, and the Town Hall. Pop. (1900), 31,817, mostly coloured.

Paramœcium. [SLIPPER-ANIMALCULE.]

Paraná, a river of South America, rising in the Brazilian state of Minas Geraes. Flowing westwards under the name of Rio Grande till its junction with the Paranahyba, it then runs in a south-westerly direction, skirting Paraguay, and receiving the Paraguay river just above Corrientes. It afterwards unites with the Uruguay to form the Rio de la Plata, some 50 miles above Buenos Ayres, when it discharges itself into the sea after a course estimated at from 2,100 to 2,800 miles. In its upper waters its chief affluents, besides the Paranahyba, are the Tiete, Paranapanema, Ivahy and Iguassu,

all on the left, whilst in the Argentine it receives the Salado, on the right. In about 24° S. it forms the fall of Guayra, below which are a series of rapids, which extend for a hundred miles. The river is continuously navigable by vessels of 300 tons from the Plata to the isle of Agipe, 150 miles above the confluence with the Paraguay, but ships drawing 16 feet can ascend as far as Rosario at high tide. The chief towns on its banks are Villa Encarnacion, Candelaria, Corrientes, Goya, Santa Fé, Parana, and Rosario.

Parana, a state in the south of Brazil, extending from the Atlantic to the Parana, and having the state of São Paulo on the N. and that of Santa Catharina on the S. It has an area of 85,430 square miles. It is hilly and well-watered and contains much forest land mostly unexplored. Cotton, coffee, manioc, grain and fruits are cultivated and maté (Paraguayan tea) is grown for export. Curitiba (10,000), the capital, has manufactures of coarse woollens. Pop. estimated at 380,000.

Parana, chief town of the province of Entre Rios, Argentine Republic, on the Parana, opposite Santa Fé. It is in railway communication with Concepcion on the Uruguay and is a station for all river steamers. It is the centre of an important grazing district, and colonies of Italians, Germans and Swiss have been formed here. From 1853 to 1862 it was the capital of Argentina. Pop. estimated at 25,000.

Paranahyba, a river of Brazil, forming part of the boundary of the states of Goyaz and Minas Geraes. About 20° S. it falls into the Parana, till then known as Rio Grande. Its length is estimated at about 700 miles.

Paraplegia. [PARALYSIS.]

Parapodia, the lateral processes on the body of many worms of the class Chaetopoda. They usually support the bristles or setæ, and may serve for locomotion or respiration.

Parasites, organisms that live upon other organisms, whether plants or animals. Those that merely live in company with others, and do not obtain their food from the organism with which they dwell, are known as commensals. Parasitism is very widely spread in the animal kingdom, and it has representatives in most groups, especially of the Invertebrata. Nearly all animals are subject to their attacks. Among the Protozoa, numerous Infusoria, such as Trichomonas and most of the Gregarines, which live in the lungs of frogs and the digestive tube of worms, are parasitic. There are few representatives among the Coelenterata or Echinoderms, but the worms include many of the most destructive. Thus all the Entozoa are parasitic, including the tapeworms, liver-flukes, and the tropical parasites Bilharzia and Filaria, which give rise to hæmaturia. Among other classes of worms, parasites occur in the Nematoda, such as those which cause gromse disease (*Strongylus pergranilis*) and the "gapes" of poultry (*Sclerostoma syngamus*); also in the Chaetopoda, where the family

Myxostomidae burrow in the stems of crinoids, and the genus *Oligognathus* lives in a Gephyrean. Very few cases occur among the Mollusca, the principal one being *Stylifer*, which is parasitic on starfish. The Arthropods supply many interesting cases; thus in the Barnacles the males are parasitic on the females. There are many parasitic insects, such as lice, fleas and bugs. Among the Arachnida the chief examples are the Ticks and Mites, the Pentastomida, which live in the nasal cavities of dogs, etc. Among the Crustacea there were two orders once recognised which included only parasites, these were the Ichthyophthiria and Rhizocephala; but the orders are now abandoned, as it is known that the former included parasitic Copepods, and the latter parasitic Cirripedia. The history of these two orders illustrates the degeneration that always ensues when animals take to this mode of life. The only case of parasitism in Vertebrates is in the case of two genera of fishes forming the family Myxinoidei; the better known of these is *Myxine*, the Hagfish.

Parasitic Disease in Man. The parasites which are met with in the human subject may be divided into those belonging to the animal and those belonging to the vegetable kingdom. The former include certain members of the tapeworm family [TAPEWORMS, *HYDATID*], a number of nematode worms (the common round-worm, the threadworm, *trichina spiralis*), and others. There are, moreover, a number of skin parasites, the itch insect and three varieties of pediculus being included among these. The organism of malaria has been declared to belong to the class of Protozoa, introduced through the bite of the mosquito, and it is not unlikely that other members of this class are concerned in the production of disease in man. The vegetable parasites consist of the fungi which are associated with some forms of skin disease (ringworm, favus, pityriasis, etc.). There is also the ray fungus which is the cause of the disease known as actinomycosis, and the fungus of Madura foot. All these parasites are members of the various groups of fungi; but by far the most important vegetable parasites are those which belong to the lowest group, the fission fungi. [BACTERIA.] Many of the most serious diseases that afflict humanity, such as diphtheria, cholera, erysipelas, tuberculosis and lockjaw, are set up in the system by the action of various bacilli, though in several cases the exciting organism has not yet been discovered.

Parasitism, VEGETABLE, the growth of a plant attached to another living organism, and depending upon it wholly or in part for its nutriment. In other words, parasitism is that form of symbiosis in which the physiological benefit is entirely obtained by one of the associated organisms, the parasite, the other being termed the host. Every gradation from partial to complete parasitism exists, and some plants combine the character of saprophytes, living, that is, upon dead organic matter, with parasitism. Parasitism is generally accompanied by the partial or complete loss of chlorophyll, and a reduction in leaves or other

assimilating organs, they being rendered unnecessary by this habit. At the same time the uncertainty of the seedling finding a suitable host leads often to increase in the number of seeds. All true parasitic plants seem to be either fungi or dicotyledons, the latter belonging either to the Gamopetalæ or to the Incompletæ. Only in the case of fungi do vegetable parasites attack animals. Such are the salmon-disease (*Saprolegnia ferax*), Empusa, and Cordyceps, which attack insects, and the fungi producing favus, ringworm and thrush in human beings. All fungi are either saprophytes or parasites, and in none is any chlorophyll present. Most of the parasitic forms are entophytic, growing, that is, mainly within the tissues of the host, producing copious mycelium, and sending out haustoria, or sucker-like branches, through the cell-walls. Pythium, Cystopus, and the potato-disease (*Phytophthora*) are comparatively simple moulds. The "rust" of wheat (*Puccinia graminis*) is a typical example of heterocism, which only occurs in fungal parasites; whilst *Agaricus melleus*, by means of its subterranean "rhizomorphs," and the various species of *Polyporus*, are examples of parasitic Hymenomycetes. Flowering parasites mostly germinate in the ground, many of them retaining some roots of their own, though becoming attached to the underground portion of the host. The eye-bright, cow-wheat, yellow and red rattle, among Scrophulariaceæ are only partly parasitic and have small green leaves. The broom-rapes, though with some roots, have no chlorophyll, and are doubtless more completely so. The dodder after attaching itself to the stem of the host, round which it twines, by haustoria, which are probably modified adventitious roots, dies at its own root, thus losing any connection with the ground. The mistletoe, though germinating on the branch of the host tree, has chlorophyll, and is, therefore, not entirely dependent. The allied sandal-wood, though a root parasite, resembles the mistletoe in this respect. No flowering-plant is more completely parasitic than *Rafflesia*, which consists mainly of one huge flower on a short root penetrating the stem of its host.

Parchment, the name given to prepared skins of animals, which are used for writing on, and in the manufacture of various musical instruments. The skins are first soaked in lime to remove the hair, then shaved, washed, dried and stretched, and finally smoothed with fine chalk or lime and pumice stone. The skins most used are those of the sheep and goat, but the skins of the wolf and ass are also used; whilst vellum—a fine kind of parchment—is made from the skins of calves, kids, and still-born lambs, and the skin of the fur-seal is sometimes employed for very fine varieties. The Eskimo use the entrails of seals. The word is also frequently used for a document written on parchment. Parchment, so called, has been made of other materials than animals' skins. By soaking cotton fibre in a solution of sulphuric acid, glycerine and water and then rolling it in sheets, what is known as "cotton parchment" is obtained. Similarly, by soaking ordinary unsized paper in dilute sulphuric acid a tough, translucent, glossy kind of paper

results, to which the name of "vegetable parchment" has been given. The word "parchment" is supposed to be derived from Pergamus, or Pergamum, a town in Asia Minor, whence it was first brought in the 10th century, or earlier. Following its introduction the papyrus, as a paper-making material, ceased to be used.

Pardon, the releasing of a person from the punishment he has, justly or unjustly, incurred for some offence. In the United Kingdom, as in most other countries, the prerogative of pardoning is vested in the sovereign. A pardon may be granted either before or during a prosecution, when it may be pleaded in bar, or after conviction, in which case it may be pleaded in arrest of judgment or in bar of execution, so that the offender is discharged from punishment. Some offences, however, cannot be pardoned; for instance, a common nuisance while it remains unredressed; and a pardon cannot be pleaded to a parliamentary impeachment. In the United Kingdom a pardon is granted by warrant under the Great Seal or under the sign manual. It may be free or conditional—that is, the Crown may annex to it a condition on the performance of which the pardon will depend. The effect of the pardon is to make the offender a new man, to acquit him of all corporal penalties and forfeitures annexed to the offence pardoned, and not so much to restore his former as to give him new credit and capacity.

Paré, AMBROSE, surgeon, was born at Bourghersent, near Laval, France, in 1509 or 1510. He was educated at Laval and Paris, where he assisted in the operations at the Hôtel-Dieu. He rose from the humblest position to be surgeon-in-ordinary to four successive kings, and possessed in particular the confidence of Charles IX., and to his influence was ascribed the cessation of the St. Bartholomew massacres (1572), though it would appear that he was himself a Roman Catholic. He took part in many campaigns and performed great services on the battlefield as a military surgeon. He published a work on the wounds inflicted by weapons of war (1552) and a valuable treatise on obstetrics. His progressive methods, however, were disrelished by the Faculty of Medicine in Paris, which thwarted him in many ways and tried to limit the publication of his works. But his fame survived both him and his detractors. He died in Paris on December 20th, 1590.

Paregoric is the name given to a preparation in the British Pharmacopœia, the *tinctura camphoræ composita*. This tincture contains a small amount of opium, and benzoic acid, oil of anise, camphor and spirit. It is often used to relieve cough.

Parenchyma, cellular tissue in plants, in which the individual cells are not elongated to more than four times their breadth. It may be loose or spongy, with spherical cells and large intercellular spaces, as in the mesophyll of many leaves; compact and dodecahedral, as in some pith; muriform, or brick-shaped, as in periderm; or stellate, as in the "pith" (mesophyll) of the rush.

Parent and Child. The duties of parents towards their children are mainly three; namely, (1) their maintenance, (2) their protection, and (3) their education. All these rest, more or less, on natural law.

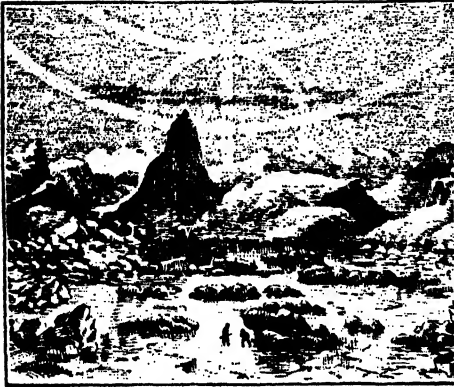
1. *Maintenance.* The common law, which has proved in some respects defective, has been supplemented by several statutes, the joint effect of which may be summarised as follows. The father and mother, grandfather and grandmother, of any poor person not able to work shall maintain him or her at their own charges if of sufficient ability, according as the quarter sessions, or two justices in petty sessions, or other authority, shall direct; and if a father runs away and leaves his children chargeable to a parish, the churchwardens and overseers shall, upon obtaining an order of magistrates for the purpose, seize his rents, goods and chattels, and dispose of them towards the required relief. Moreover, the parent himself in such a case may be punished under the Vagrant Acts; as he may also be, if, being able, he shall wilfully refuse or neglect to maintain his family, whereby they become chargeable. Also all the relief given under the poor laws to any children under the age of sixteen (such children not being blind or deaf and dumb) shall be considered as given to the father or (if he be dead) to his widow; and every person is made liable to maintain the children of his wife born before his marriage to her (whether legitimate or illegitimate) as part of his own family and is chargeable with all relief granted to them under the poor laws until they attain the age of sixteen or until the death of the mother. Again, by other statutes, in any case in which any child is detained in a certified "reformatory" or "industrial" school, the parent, step-parent, or other person liable for his maintenance, if of sufficient ability, is made liable to contribute to his support, maintenance, and training therein to the extent of *£s.* per week or such lesser sum as shall be directed. No person, however, is bound to provide a maintenance for his issue, unless where the children are impotent and unable to work, through infancy, or disease, or accident, and then is only obliged to find them in necessities.

2. *Protection.* This duty is distinctly recognised in English jurisprudence, it being laid down in particular that a parent may maintain and uphold his children in their lawsuits without being guilty of the offence of maintaining quarrels, and that he may also justify an assault and battery in defence of their persons.

3. *Education.* The third duty of parents is to give their children education suitable to their station in life, a duty which is also pointed out by reason. In the United Kingdom provision for the education of children has during a few centuries been made by churches and chapels and by the munificence of wealthy persons and corporations. In consequence, however, of the vast increase of the population the supply (at least of elementary schools) has never outstepped the demand, and this matter received the special attention of the

Legislature in the year 1870 by the passing of the Public Elementary Education Act, by which very extensive further provision was made for the education of the poorer classes of children, and the duty of seeing to their education was made compulsory on the parent. In 1891, elementary, and in later years to a large extent secondary, education was practically made free.

Parhelion, an image of the sun often formed when halos intersect; parhelia are hence often called mock-suns. Solar halos are generally considered to be due to refraction and reflection of the sun's rays by ice crystals in the higher strata of the air. Double refraction by the crystals may cause two halos, and reflection from the ice faces may give rise to others; some of these will probably



PARHELION, OR MOCK SUN.

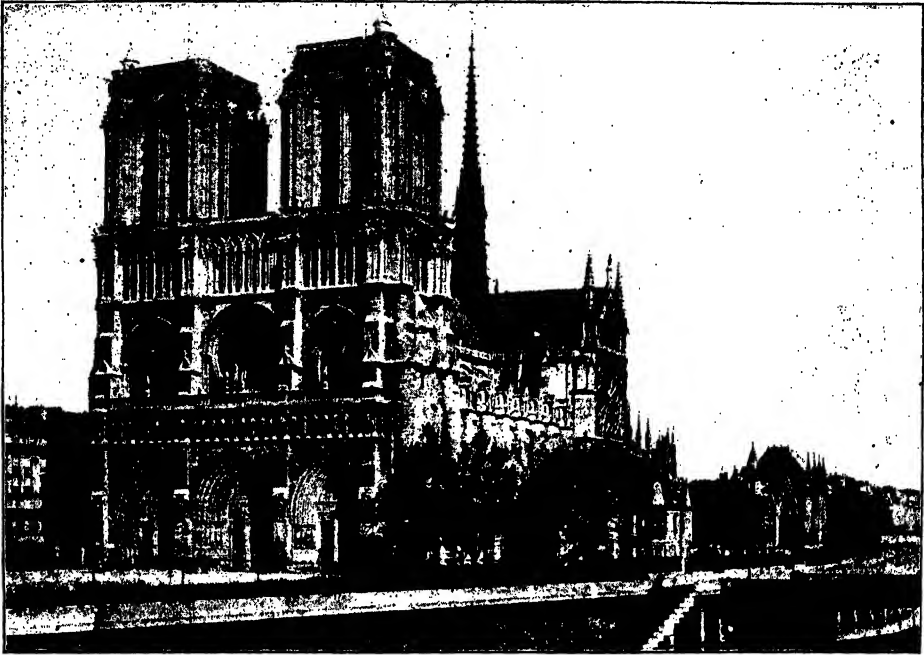
intersect, causing a parhelion to be seen. The parhelia are usually brightly coloured like the halo, and are sometimes accompanied by fiery tails. Some very fine parhelia were seen at Brighton on June 5th, 1875.

Pariah, a term wrongly applied by Europeans to all outcastes in India, but properly restricted to a distinct group of thirteen low castes included in the "Right" division in the south. The true outcastes are the Chandakas of the sacred writings, the Kanjars of the Central Provinces, the Paliyars of Travancore. Pariah (properly Pahariah) simply means "highlander," and was originally applied by the Aryan intruders to the dark aborigines driven by them to the hills, and excluded from their social organisation. Hence arose its secondary meaning, which has been extended even to those dogs which in the east have reverted to a semi-wild state, prowling in packs about the outskirts of the towns and doing scavenger work like some of the Indian Pariahs. In the Tamil country of South India, the caste of shoemakers and the lowest caste of washermen are deemed lower than Pariahs, who deal out to those unfortunates similar treatment to that which they themselves have received from those above them.

Paris, the capital of France, on the Seine, about 110 miles from the mouth of the river, which divides the city roughly into two parts, besides forming, in its heart, the islets of La Cité and St. Louis. It is one of the most ancient cities in Europe, and was first known by its Latin name of Lutetia. It was the favourite residence of more than one Roman Emperor; and the remains of the *Thermæ*, or warm baths, of Roman construction are still to be found in the Palais des Thermes. The name Lutetia is generally derived from *lutus* or *lutum*, signifying "mud;" and though one hesitates to accept this ignoble origin for the name of a city which nineteen centuries ago was already known as a town of brightness and joy, it is nevertheless a fact that the original Lutetia was concentrated in an island which was not only surrounded by water, but was still further protected on more than one side by impassable marshes. During a long course of years Paris was looked upon as a nautical city. In its arms a ship figured as the principal emblem, and does so even to this day. The commercial destinies of the city were controlled by a council of shipowners or *nautæ*, as in Roman times they were called; and the "mud city of the Parisians" had several times to defend itself, for the most part without success, against the attacks of Norman pirates, advancing from the neighbourhood of Rouen and from the regions between Rouen and the mouth of the Seine. By these invaders Paris was plundered and burned. Then it was built up again on a larger scale; but only to be pillaged and destroyed again and again. At last the warlike Normans directed their energies towards a more important point; and Paris, which was never razed to the ground but to spring up again in greater beauty and greater strength, was allowed to pursue unimpeded its natural growth. The topographical—one may also say the geometrical—history of Paris is from this moment the history of its extension towards the walls built to enclose it. Its fortifications, its barriers, have had to be pulled down and built up again some distance farther out; and this process has been several times repeated. The boulevards of the present day, which seem to be, and in fact are, in the very heart of the city, were at one time ramparts. Many of what used to be known as the "outside boulevards" are now well within the walls; and the fortifications erected in the reign of Louis Philippe (who reigned from 1830 to 1848) were, after the Franco-German War (1870-1), found useless and in the way; not only because they had failed to prevent the investment and bombardment of the city, but also, and above all, because the city had outgrown them. Once more it has burst its boundaries; and to enable it to breathe with freedom, it has been found necessary to pull down a portion, at least, of the defences that bound it so tightly without defending it entirely against a besieging enemy. A wide girdle of outlying, interconnected forts has therefore been constructed around Paris far in advance of the old fortifications. The sieges undergone by Paris can scarcely be counted. Even in modern times it has three times been entered by force: by the Powers allied against the first Napoleon in 1814 and 1815,

and by the United Germans in 1871. In the civil and religious wars, by which France was so long devastated, Paris was frequently the scene of conflicts, sometimes in the streets and public places, more often outside the walls. Joan of Arc (more properly "Jeanne Darc") was once with an army besieging or at least attacking, Paris from the heights of Montmartre. It was outside Paris, at the head of a victorious army, that Henri IV. uttered his celebrated exclamation as to Paris being "well worth a mass" (*Paris vaut bien une messe*); whereupon he made peace with his already vanquished enemies, and entered the capital to hear mass at

drove Charles X. from his throne in 1830, the Citizen King being himself similarly expelled in 1848. The flight of Louis Philippe and of his minister Guizot (who escaped in the disguise of a footman) was followed by the establishment of a republic over which Lamartine, General Cavaignac and Prince Louis Napoleon successively presided. On the 2nd of December, 1851, the Prince President executed a *coup d'état*. He dissolved the Chamber, arrested, imprisoned, and afterwards exiled many of its principal members, occupied the streets of Paris with troops, suppressed all resistance, introduced universal suffrage, and got himself elected Pre-



NOTRE DAME, PARIS.

(Photo: X, Paris.)

Notre Dame. The French revolutions since the time of Louis XVI. have all originated and been accomplished inside Paris, without reference to the views of the provinces, where the decisions of the capital are accepted as a matter of course. In 1789 the taking of the Bastille was the first incident in a struggle which ended in the destruction of the ancient monarchy, the decapitation of the king by the newly-invented guillotine, and the establishment of the Republic. After the excesses of the Revolution (which, meanwhile, had introduced many invaluable reforms), it was at Paris that Napoleon made his *coup d'état* with the view, soon to be realised, of concentrating all power within his own hands. When the Parisians had tolerated the government of the Restoration for sixteen years, it was at Paris that the revolution broke out which

silent for ten years. A year later he transformed the republic into an empire, and proclaimed himself emperor. Two years later came the Crimean War, and on its conclusion in 1856 the emperor—acting under the advice of Baron Haussmann—began to occupy himself seriously with a system of public works which he had thought of from the beginning, and which, from 1856 until the abrupt termination of his reign, was pursued with unceasing activity. Up to 1859 (when the liberation of Lombardy from Austrian rule gave to the Second Empire a new glory) the sum spent annually on public works averaged about £600,000, and from 1859 until the fall of the Empire in 1870 at least £700,000. It has been computed that of all the Paris houses existing in 1870, less than one-third had been built prior to 1852. This seems at

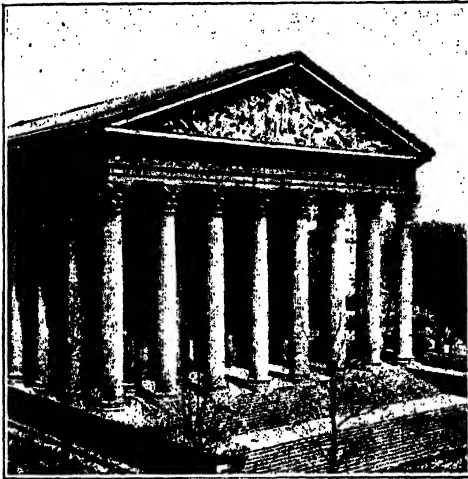
first an exaggerated estimate; but the continuation of the Rue de Rivoli—one of the principal domestic performances of the Second Empire—involved the destruction of entire streets, in which, here and there, some historic building alone was spared. Some cynical or merely thoughtless critics of the Second Empire could see nothing in the widening and prolongation of the principal streets of Paris, but a preparation for sweeping them with artillery, when the day should come for Napoleon III. either to disappear as Louis Philippe and Charles X. (not to mention the unhappy Louis XVI.) had disappeared before him, or to defend his position and remain. His chief if not his sole object was to make of Paris the finest and most salubrious city in the world; though the abundant occupation ensured to workmen of various kinds had doubtless the effect of keeping at peace the most dangerous part of the Paris population. From 1860 to 1870 the prosperity of the French capital seemed at its height. Perhaps the most brilliant year of the whole period of the Second Empire was 1867, when King William of Prussia (afterwards to be known as the Emperor William), Bismarck, and Moltke all visited the Universal Exhibition of Paris, there to meet royalties and excellencies of all nations, with Prince Gortschakoff, Russian Minister of Foreign Affairs, prominent among them. The war of 1870, and especially the Battle of Sedan, brought the Second Empire to an end without a blow being struck by its enemies in the French capital. Since the establishment of the Third Republic France, while keeping herself prepared for war, has remained at peace.

Of the many great public buildings only the more famous need be mentioned. The cathedral of Notre Dame dates in part from the 14th century. The Panthéon, built as the church of Ste. Génévieve in 1764, has alternated between its original function and that of a (non-Christian) mausoleum for great men. The Madeleine, built by Napoleon I. as a temple of Victory, to commemorate the achievements of the Grand Army, is an admirable specimen of modern classical architecture; the Sainte Chapelle (in the Palais de Justice), apart from its deeply-interesting historical associations, contains some of the finest examples of stained-glass in the world; and the great church of the Sacré Cœur on Montmartre commands a beautiful, almost a bird's-eye view of the fair city. Other notable churches are St. Germain-des-Prés, the most ancient of all; St. Étienne du Mont, the best lighted, with a beautiful stone screen; St. Germain l'Auxerrois, the tolling of the bell of which was the signal for the outbreak of the St. Bartholomew Massacre; St. Eustache, which played a part in the great Revolution; and the church of the Invalides, containing the *tombau* of Napoleon I., whose remains were laid there in 1840. Of the numerous palaces, the Tuileries, begun by Catherine de' Medici, the royal and imperial residence, mostly burnt down by the Commune, has not been rebuilt; the Louvre (begun 1541) has since 1793 been the home of the great collections of arts and antiquities and contains several priceless objects: the *Élysée* is devoted to the President, the Luxembourg to the Senate;

the Palais Royal, the residence of Philippe Égalité, long the first of bazaars, entered upon an era of melancholy when the bazaar lost much of its hold upon the public taste, owing to the construction of such magnificent thoroughfares as the Avenue de l'Opéra, and the Rue de la Paix and the Grand Boulevards. The Opera House is a costly and gorgeous monument of the Second Empire; the Sorbonne, in the Quartier Latin, is the seat of the University. The Bibliothèque Nationale, the collections of arts and antiquities in the Louvre (already noted) and those in the Hôtel Cluny, the collection of modern French pictures at the Luxembourg, the zoological and botanical gardens of the Jardin des Plantes and the Jardin d'Acclimatation, can hardly be rivalled. The Palais de Justice and Hôtel de Ville are among the later buildings that were due to the madness of the Communists, or at least the mob acting in their name. The three great monuments of Napoleon I. remain—the Hôtel des Invalides, the Arc de Triomphe, and the Vendôme Column. The parks, gardens and public spaces of Paris have long been famous as triumphs of art, especially the Tuileries gardens, the gardens of the Luxembourg, the Buttes-Chaumont, the Parc Monceau, the Place de la Concorde, the Embankments, the Champs Élysées, and the more spacious and less artificial Bois de Vincennes and Bois de Boulogne. The exhibitions of Paris have left traces in the Trocadéro Palace (1878), the Eiffel Tower (1889), the two Palais des Beaux Arts and the Pont Alexandre III. (1900). In respect of philanthropic and charitable institutions Paris is rich. The most famous hospitals are the Hôtel-Dieu, La Charité, and La Pitié. Benevolence raised La Salpêtrière, a vast asylum for aged women, the Foundling Hospital, numerous crèches, besides other institutions for the infirm, the maimed, the defective, the sick and the convalescent. The cemetery of Père-la-Chaise, covering more than 200 acres, has a world-wide reputation. The prisons include La Force, the Nouveau Bicêtre (for life sentences), St. Pélagie (for political offenders), and St. Lazare for women. Among public institutions should be mentioned the Mint, the Observatoire, the Institut, the Chambre des Députés and the Morgue, the gruesome edifice close to Notre Dame in which are exposed for recognition the bodies of persons found in the Seine. Of places of amusement the name is Legion, beginning with the Théâtre Français, the Opéra Comique, and the Odéon, and passing on to numerous concert-rooms, music-halls, and circuses, the Musée Grévin and *cafés chantants* and popular ball-rooms. Public monuments, statues and fountains are common and mostly real ornaments of the streets and open spaces where they stand. The obelisk from Luxor, erected in 1836 in the Place de la Concorde, occupies the site of the guillotine at which Marie Antoinette, Louis XVI., and many other victims, famous and infamous, were beheaded during the Terror of 1793-4, and the Column of July commemorates the fall of the Bastille which stood hard by. The Seine, within the bounds of Paris, is crossed by many bridges, of which the most celebrated are the Pont Notre Dame

(1500) and the Pont Neuf completed by Henri IV. in 1604.

Paris, during the Third Republic, has lost very few of its attractions. The nobility, in the absence of a Court, cares but little for life in the capital, and remains in the country, or retreats to other lands. One effect of this abstinence of the old Noblesse may be seen in the difficulty of maintaining an Italian Opera as it existed under the First Empire, the Restoration, the reign of Louis Philippe, and the Second Empire. Still, the Opera is not everything. Unusual facility is afforded the Parisians for locomotion, whether by omnibuses (organised on an elaborate system), or trams, or circular and underground railways, or by an excellent service of steamers for the right and left banks of the river. Paris is not a great



THE MADEKINE.

manufacturing centre, in the sense that it accommodates huge factories and mills. But nevertheless industrial activity is immense and varied. The commonest and most material wants of man are catered for on the most extensive scale. The *halles*, or wholesale markets, the *marchés*, or retail markets, the great *abattoirs*, or slaughter-houses, the innumerable hotels, restaurants and *cafés*, all furnish employment for enormous numbers of persons. The building trade is constantly brisk, and the printing and publishing business of the country is concentrated in the capital. Of what are called *articles de Paris*—jewellery, bronzes, knickknacks, artistic pieces of furniture and other goods—the city has made a speciality. Under the Republic the masses have experienced comfort if not prosperity, and there is a marked absence of the signs of extreme poverty that greet one in too many of the world's leading towns. Paris is divided into twenty *arrondissements* (districts), each under a *maire* (mayor) and two assistant councillors, and

the city is governed by a popularly elected municipal council, the chief of which is the Prefect of the Seine, who is appointed by Government. The drainage, cleansing, lighting, fire-brigade, and police (consisting of *gendarmes*, or civic guard, and *sergents de ville*, or city police) are efficiently organised, and the water supply and public sanitation generally—once a byword and constant source of danger—have been remarkably improved. In 1784 the population amounted to 660,000, in 1800 to 547,756—the considerable decrease being due to the deaths and emigration caused by the Reign of Terror; in 1851 it was 1,053,262, and in 1901 it was 2,660,559—the second most populous town in Europe.

Paris, or ALEXANDER, one of the chief personages in the Homeric story, was the second son of Priam, King of Troy, and Hecuba, who dreamed that she had brought forth a firebrand. Euripides makes his father give him to a shepherd to be exposed on Mount Ida, where, however, he was fed by a she-bear and brought up by the shepherd, till at length he is discovered and owned by Priam. His wife Oenone warns him not to go to Greece, but he does so, and carries off Helen from her husband Menelaus, King of Sparta. This gave rise to the siege of Troy by the Greeks, led by Agamemnon, brother of Menelaus. Hera (Juno) and Athena (Minerva) took the side of the Greeks, because Paris had given the golden apple, the prize of beauty, to Aphrodite (Venus), who afterwards saved him when worsted in the combat by Menelaus. During the siege Paris kills Achilles by a stratagem, but is wounded when the city was taken by a poisoned arrow shot by Philoctetes. Of this wound he dies, the aggrieved Oenone refusing to heal it.

Paris, FRANÇOIS DE, Jansenist deacon, was born in Paris in 1630. He entered the Church, but after he had become deacon, he did not proceed to the priesthood, preferring to lead a solitary life devoted to study, charitable works, and manual toil. Among his books were commentaries on the Epistles to the Galatians, Hebrews, and Romans, and *Science en Vrai*. He died in Paris on May Day, 1727, an ardent Jansenist, denouncing almost with his last breath the Papal bull *Unigenitus*, issued in 1713. He was buried at St. Médard, and crowds made pilgrimages to his grave, where, it was alleged, miracles were wrought. From the ecstatic attitudes here assumed by the Jansenists, they acquired the name of Convulsionnaires.

Paris, LOUIS PHILIPPE, COMTE DE, grandson of King Louis Philippe and the son of the Duc d'Orléans, was born in Paris on August 24th, 1838. He lived chiefly in England until 1871, and then returned to his French estates, which had been restored to him. In 1873, at Frohsdorf, he agreed that his claims to the French crown should give way to those of the Comte de Chambord; and when in 1883 the representative of the elder line of the Bourbons died, all the Legitimists acknowledged him as head of the House. Three years later he retired again to England, in

consequence of a decree of expulsion passed by the French Chambers. In 1888 he issued a manifesto in favour of revision. Among the works with which he relieved his long exile were *Damas et le Liban* (1861), *Associations ouvrières en Angleterre* (1869), and *Histoire de la guerre civile en Amérique* (1874), in which war, along with his brother the Duc de Chartres, he had acted as aide-de-camp to General McClellan in the campaign of 1862. The Comte de Paris died at Stowe House, near Twickenham, England, on September 8th, 1894.

Paris, MATTHEW, the best of the English chroniclers, was born about the beginning of the 13th century. On January 21st, 1217, he entered the Benedictine abbey of St. Albans, and in 1248 was sent by the Pope to Norway as visitor of the Order. He died in 1259. Judging from internal evidence, he seems to have been an Englishman, but we know nothing of his parentage. He appears to have been an accomplished mathematician and poet, as well as historian, and was intimate with King Henry III. His *Chronica Majora* is a continuation of Roger of Wendover's work from the year 1235, and is a very valuable authority on the times of Henry III. He also wrote *Lives of the Abbots of St. Albans*; and the *Flores Historiarum*, usually attributed to Matthew of Westminster, may also have been his work. The *Chronica Majora* was edited by Dr. Luard for the Rolls Series in 1872-3.

Parish, an ecclesiastical and now, in the British Empire, a civil district, generally comprising the locality originally placed under the charge of one priest or minister, and now separately rated to the relief of the poor. Originally the parish (Late Latin, *paruchia*, *paracia*; ecclesiastical Greek, *paroikia*, "neighbourhood"; French, *paroisse*) was the district or diocese under the charge of a bishop. In Great Britain up to 1894 about two-thirds of the civil parishes, which are divisions of a town or county for purposes of local government, were continuous with the ecclesiastical parishes, and the controlling local authority in England and Wales was the vestry under the presidency of the incumbent, the officers being churchwardens, overseers, guardians, and constables; but since 1894 the elective parish council has had the control of all the temporal business of local government so far as it is delegated to the parish, and the limits of civil parishes have been considerably altered in many cases. Independent subdivisions of towns and counties for special purposes have also been styled parishes. In Louisiana, United States, the counties are called parishes.

Park, MUNGO (African explorer), was born at Foulshields, Selkirkshire, Scotland, on September 10th, 1771. He was educated at Selkirk Grammar School and Edinburgh University, and became a naval surgeon. In 1792 he went to Sumatra on board the *Worcester*, and wrote, for the Linnean Society, an account of eight new species of fishes he discovered there. Three years later, by the influence of Sir Joseph Banks, he was employed by the African Association, and in the course of the year 1796

penetrated to the sources of the Niger. After suffering great hardships, in which his life was imperilled, he succeeded in reaching England again in 1797. In 1799 he published his *Travels in the Interior of Africa*, and until the end of 1804 lived the quiet life of a country doctor at Peebles, enjoying the friendship of Dr. Adam Ferguson, Professor



MUNGO PARK.

(From the drawing by H. Edridge.)

Dugald Stewart and Walter Scott. Early in 1805 he took command of Lord Hobart's Niger expedition. When the party reached Bammaku it had been reduced by disease from forty-four to eleven; and the rest, persevering in their course, seem to have perished, in 1806, at Bussa, where they were attacked by the natives and drowned in trying to escape. An account of the second journey appeared in 1815.

Parker, JOSEPH, preacher and divine, was born at Hexham, Northumberland, on April 9th, 1830. He was educated at University College, London, and ordained minister of the Congregational Church in Banbury in 1853. In 1858 he was called to Cavendish Street Church, in Manchester, where he laboured till 1869, when he came to London in charge of the Poultry Chapel, which was removed—the site being required for City improvements—to Holborn Viaduct in 1874 and re-named the City Temple. Here his remarkable gifts as a racy and powerful orator, despite occasional lapses into eccentricity, attracted large audiences at every service. His pen, too, was always busy, and several of his works attained great success, amongst the best being *Ecce Deus* (1868), in answer to Sir John R. Seeley's *Ecce Homo*, *The People's Prayer-Book* (1889), *The People's Bible*, a "pastoral

commentary" in many volumes, the first of which appeared in 1885, and *A Preacher's Life* (1899), an autobiography that failed only for want of trouble and method. He was contemplating a *Life of Jesus* on original lines when he died in London on November 28th, 1902.

Parker, MATTHEW, Archbishop of Canterbury, was born at Norwich, England, on August 6th, 1504, and was educated privately at St. Mary's Hostel and Corpus Christi College, Cambridge, where he was famous both for his scholarship and his preaching. In 1544 he became Master of Corpus Christi College, having previously served as Chaplain to Anne Boleyn (1535) and dean of the College of St. John the Baptist, at Stoke-by-Clare in Suffolk. In 1552 Edward VI. made him Dean of Lincoln, but having espoused the cause of Lady Jane Grey, he lost all his preferments during Mary's reign and practically had to live in concealment. On the accession of Elizabeth, however, he regained his old favour and, much against his inclination, was appointed in 1559 to the see of Canterbury. His chief services as Archbishop were the revision of the Articles, which were reduced from forty-two to thirty-nine, and the publication of a translation of the Scriptures, known as the Bishops' Bible (1563-8), part of which he translated himself, while acting as general editor of the scheme. Parker died in Lambeth on May 17th, 1575.

Parker, THEODORE, rationalist preacher and reformer, was born at Lexington, Massachusetts, United States, on August 24th, 1810. He was educated privately and at Harvard, paying his fees by working on his father's farm. In 1837, after having kept a school for some years, he became a Unitarian minister at Roxbury, near Boston. Here his advanced views gave umbrage to the clergy of his own sect, and a sermon preached in 1841 on "the transient and permanent in Christianity" completed the rupture. Many of his congregation stood by him, however, and he delivered at Boston in 1841-2 the lectures afterwards published in book form as the *Discourse of Matters pertaining to Religion*. After a year's travel in Europe he returned to Boston in 1844 and devoted himself to lectures throughout the United States and to the advocacy of many social reforms and the abolition of slavery. His strenuous life impaired a naturally weak constitution, and Parker died of consumption at Rome (in the course of a trip to Europe for his health's sake) on May 10th, 1860.

Parkeria, a genus of spherical fossils from the Greensand of Cambridge, which has been regarded as a gigantic arenaceous Foraminifer, but is now assigned to the Hydrozoa.

Parkes, SIR HENRY, statesman, was born on a farm at Stoneleigh, Warwickshire, England, on May 27th, 1815. He was educated at village schools and became an ivory turner in Birmingham. Along with his young wife he emigrated, in 1839, to New South Wales. After trying various occupations, he settled in Sydney and, in 1849, founded the *Empire*, a newspaper of Liberal views, which survived till

1857. He was elected to the Legislative Council in 1854 and again in 1858, after the colony had secured responsible government, a reform for which Parkes laboured hard and long. In 1866 he became Colonial Secretary, was Education Minister in 1867-70, and was Premier of New South Wales from 1872-5, in 1877, from 1878-83, and 1887-91. He had been created K.C.M.G. in 1877. He wielded great influence throughout most of his career, holding the colony staunch to Free Trade, and latterly strongly supporting the movement for federation based on what he called "the crimson thread of kinship." He died in Sydney on April 27th, 1896. In addition to several volumes of verse he published *Fifty Years in the Making of Australian History* (1892), a work of interest and of value to historians of New South Wales.

Parkes's Process, a process employed for extracting the silver from argentiferous lead. As most lead ores contain some silver, the lead smelted from the ores is always more or less rich in the more valuable metal. In Parkes's process a small quantity of melted zinc is added to the molten lead and well stirred. When the mass cools the zinc rises to the surface and is skimmed off, it being found that the greater part of the silver has passed into the zinc from which it is subsequently extracted. The process was named after its inventor, Alexander Parkes, a Birmingham chemist (1813-90).

Parkman, FRANCIS, historian, was born in Boston, Massachusetts, on September 16th, 1823, and educated at Harvard, where he graduated with high rank in 1844. Intimate knowledge of Indian life, gained by living among the Red men in Canada and Dakota, turned his attention to the conquest of Canada, and he finally determined to specialise in the history of the lengthy conflict between France and Great Britain. The first fruits of his study appeared in 1851 in *The Conspiracy of Pontiac*. This was followed by other valuable works, such as *The Pioneers of France in the New World*, *La Salle and the Discovery of the Great West* (1869), *The Old Regime in Canada*, and *Montcalm and Wolfe* (1884), the series practically constituting one great and homogeneous work on *France and England in the New World*. Parkman died at Jamaica Plain, near Boston, on November 8th, 1893.

Parlement, one of the local courts of justice in France prior to the Revolution of 1789, of which the chief was the Parliament (French, *Parlement*) of Paris, the provincial parlements meeting at Aix, Besançon, Bordeaux, Dijon (Flandre), Douai, Grenoble, Metz, Nancy, Pau, Rennes, Rouen and Toulouse. The Paris Parliament originated in the royal council, and early in the 14th century was organised into three chambers, the Grande Chambre, the Chambre des Requêtes, and the Chambre des Enquêtes. It acquired considerable political influence in the 17th and 18th centuries. In the beginning the mere creature of the royal will by which it was called into being, it gradually lost much of its obsequiousness and dared discuss the sovereign's

edicts as well as merely register them. Strong kings like Louis XIV. and strong ministers like Richelieu naturally suppressed this tendency, but before its extinction in 1770, the old Parlement had shown unmistakable signs of dissatisfaction with the part it was forced to play.

Parley, PETER. [GOODRICH.]

Parliament, the Supreme national council and legislature of England, which developed from the Saxon witenagemot, or king's council of barons and tenants in chief of the Crown and the great officers of the Court. The first move in a popular direction was opposition to the sovereign on the part of his councillors; next came the establishment by Magna Charta (1215) of a fixed supreme civil court; thirdly, the admission of knights of the shires towards the end of John's reign; next, the election of twelve representatives by the commonalty (1258), when a permanent council of fifteen—the forerunner of the Privy Council and the Cabinet—was instituted, and, lastly, the summoning of elected knights and burgesses to the parliaments or councils of 1265 and 1295. The division of Parliament into two houses was completed by 1341, and during the reign of Edward III. its powers developed substantially. After a fluctuating but gradually progressive career, the authority of Parliament was finally confirmed on the accession of William III. Its constitution has been modified by the Triennial Act (1694), when party government began, and the Septennial Act (1716), and its composition has always been more or less affected by every reform since the first great Act of 1832. The Imperial Parliament now consists of the House of Lords (including the bishops as Lords Spiritual) and the House of Commons, the three estates of the realm thus being the Bishops, the Lords, and the Commons. In addition to their legislative functions, either house, in High Court of Parliament assembled, sits as a judicial court to try certain special cases, such as high treason, contempt of Parliament, and misconduct of public officers. There was a Scots Parliament until the Union (1707), and an independent Irish Parliament from 1782 to 1799. The self-governing colonies of the British Empire have Parliaments, and the institution if not the term has been adopted by nearly all the great Powers of the world.

Parliamentary Bill. Before a bill becomes an Act of Parliament it must be approved by the Lords and Commons, and receive the royal assent. In either House a public bill must be read twice, go into committee—of the whole House, or a select committee, or a standing committee (to which bills concerning law and trade may be referred)—and be then reported to the House and read a third time, before being sent to the other House.

Parliaments, CLERK OF, is one of the chief officers of the House of Lords. He is appointed by the Crown by letters patent. On entering office, he makes a declaration to make true entries and records of the things done and passed in the Parliaments, and to keep secret all such matters as shall

be treated therein. By a statute of George III.'s reign he is directed to endorse on every Act the date on which it receives the royal assent.

Parma, capital of the province of Parma, northern Italy, situated on a river of the same name, 72 miles S.E. of Milan. It was formerly the chief town of a duchy which lay between the Milanese and Modena. Parma and Piacenza, with the surrounding territory, passed from the Pope to the Farnese family, and from them to the Spanish Bourbons, who (with a short interval) held it (with Guastalla) till, in 1796, it was occupied by the French. From 1814 till 1847 the duchy belonged to Maria Louisa, wife of Napoleon. In the interval before its incorporation, in 1860, with the kingdom of Italy it was ruled by the Duke of Lucca. The city of Parma is noted for its art treasures. The ducal palace has a fine gallery of pictures by Correggio, and there are frescoes by this artist in the 11th-century cathedral and the church of St. John. The church of Santa Maria della Steccata contains the tombs of the Farnese. Parma has a university and is notable for its Baptistry and the ducal library. The place was twice besieged by the Emperor Frederick II. The manufactures include silk goods, textiles, lace, metal ware, tobacco, glass and pianos and other musical instruments, in addition to printing. There is also a brisk trade in cattle, grain, cheese, wine, and silk. Pop., 49,370.

Parmenides, one of the chief of the Eleatic school of philosophers, flourished about 450 B.C. His philosophy, conveyed in a poetic form, was designed to demonstrate the reality of Absolute Being, and he approaches some modern identifications of it with thought. The remains of his works were translated into English hexameters by Thomas Davidson (1870), a prose version being given in W. L. Courtney's *Studies in Philosophy* (1882).

Parmigiano, the more common name of GIROLAMO FRANCESCO MARIA MAZZOLA, painter of the Lombard school, was born at Parma (hence his nickname) on January 11th, 1504. He began to paint at an early age and in 1523 went to Rome. Here Clement VII. became his patron, and he was actually at work upon his "Vision of St. Jerome" (now in the National Gallery, London), when, in 1527, the Imperialist troops captured the city. After spending about forty years at Bologna, he returned to his birthplace, but died on August 24th, 1540, near Cremona, after having been imprisoned for his dilatoriness in executing the frescoes for Santa Maria della Steccata, in Parma. A "Madonna and Child" by him is at Bologna, and he painted portraits of Amerigo Vespucci and other contemporaries. His "Cupid Shaping a Bow," a well-known picture, is at Vienna.

Parnassus, a mountainous mass on the borders of the modern departments of Phocis and Boeotia, Greece, 72 miles N.W. of Athens. Its highest point is 8,068 feet above the sea. It was held to be the holiest mountain in ancient Greece. On its southern face were situated the famous oracle of Apollo at Delphi, the fountain of

Castalia, sacred to Apollo and the Muses, and the Corycian Cave, a stalactitic grotto, 330 feet long and 200 feet wide, which was haunted by nymphs. On the summit of the mountain the Bacchantes celebrated the orgies of Dionysus (Bacchus). Owing to the nature of its legendary associations, Parnassus came figuratively to be regarded as the abode of poetry and home of poets. Thus aspirants to poetic fame are often spoken of as "climbing Parnassus." Even Robert Burns so wrote of himself—"And now sma' heart hae I to speel the steep Parnassus."

Parnassus, Grass of, a beautiful plant (*Parnassia palustris*) of somewhat doubtful affinities among Dioclytedons. It occurs in the northern hemisphere from the temperate zone almost to the Arctic regions. It is common in bogs in mountainous regions, bearing heart-shaped radical leaves, and a solitary creamy-white pentamerous flower, more than an inch across, with delicately-veined petals, and five ciliate scale-like nectaries, one at the base of each petal. The five spreading stamens, which are alternate with the petals, rise in succession and burst outwards.

Parnell, CHARLES STEWART, leader of the Irish Home Rulers, was born at Avondale, County Wicklow, Ireland, on June 27th, 1846, and educated privately and at Magdalene College, Cambridge. In 1875 he was an unsuccessful candidate for the county of Dublin, but in the same year was returned as a Home Ruler for Meath. During this, his first parliament, he and Joseph Biggar elaborated the policy of obstruction. When Isaac Butt died, in 1879, Parnell became the virtual leader of the Home Rulers, though William Shaw nominally had succeeded. Parnell was elected for three constituencies in 1880—Meath, Mayo, and Cork city—and chose to sit for the last-named. He threw himself into the land agitation and visited the United States to raise funds. As President of the Land League he was prosecuted in January, 1881, but the jury could not agree upon a verdict. The pitch to which he carried his opposition to the Coercion Bill of 1881 necessitated his removal, with twenty-six of his followers, from the House of Commons on February 3rd. In the autumn of that year he was incarcerated in Kilmainham for issuing a "No Rent" manifesto, but was released, after eight months' confinement, in May, 1882. He condemned the Phoenix Park murders, committed shortly after his release, opposed the Crimes Bill, introduced in consequence of these outrages, and in 1884 the Land League was revived under another name, with Parnell as president. His popularity among Irishmen was attested by a testimonial presented to him in 1883, and his power was shown by the fact that in the elections of 1885 the Home Rule candidates were practically his nominees. The number of his following now enabled him to hold the balance between parties in the Imperial Parliament; and, being unable to obtain anything from the Conservatives, he assisted Mr. Gladstone to overthrow their Ministry (1886). When the Liberal leader brought in a Home Rule Bill he supported him, and opposed the Coalition Ministry

which followed the rejection of it by the country. In 1888 the Parnell Commission appointed to investigate certain charges made by *The Times* sat and, after a few months' examination of witnesses, gave a decision on the main issues in favour of Parnell. In 1889 Parnell reached the height of his popularity, after the exposure of the Pigott forgery. A year later, however, the result of the O'Shea divorce case, in which he was the co-respondent, closed his career. Declining to retire from politics, however, he continued to fight for his own hand with desperate courage, but his health gave way and he died at Brighton on October 6th, 1891. His last words were, "Let my love be conveyed to my colleagues and to the Irish people." He was buried at Glasnevin Cemetery in Dublin, on October 11th, amidst extraordinary demonstrations of sorrow and respect.

Parnell, THOMAS, poet, was born in Dublin Ireland, and educated at Trinity College. He entered the English Church and in 1705 was appointed Archdeacon of Clogher, but spent much of his time in London, where he enjoyed the best literary society of the day. In October, 1718, he was taken ill at Chester on his way to Ireland and died in a few days. He was author of *The Hermit* and some odes, and had a ready wit.

Parnell Commission. Just before the third reading of the Coercion Bill in 1887 *The Times* (April 18th) published, in the last of a series of articles headed "Parnellism and Crime," a facsimile of an alleged letter from Charles Stewart Parnell, dated 1882, approving the Phoenix Park murders. In 1888, on the production of other letters, a commission of three judges—Sir James (afterwards Lord) Hannen, Mr. Justice A. L. Smith and Mr. Justice Day—was appointed to investigate the whole question of the alleged connection between the Irish Parliamentary party and Irish crime. Under cross-examination (February 21st, 1889), Richard Pigott admitted that the letters were forged by himself, following up his confession by committing suicide in Madrid a few days later. Parnell's action for libel against *The Times* was consequently settled by the payment to him of £5,000 and costs. The Report (February 13th, 1890) exonerated the Irish members from the graver charges, though not from incitement to intimidation or from association with the Irish revolutionists in America.

Parody, a literary travesty of a serious composition in which the style and words of the original are imitated for the expression of quite different and generally ridiculous ideas, or in which mannerisms are absurdly exaggerated. An instance of a parody which is as serious, but for the obviousness of the imitation, as the original is Lewis Carroll's, "Take care of the sense and the sounds will take care of themselves." The finest work in parody has been done, among others, by Horace and James Smith in *Rejected Addresses*, Bret Harte in *Condensed Novels*, C. S. Calverley in *Verses and Translations* and *Fly Leaves*, in the *Bon Gaultier Ballads*, and occasionally in *Punch*.

Paros, an island of the Cyclades group, in the Grecian Archipelago, Greece, 6 miles W. of Naxos. It has an area of 96 square miles. The highest point is Mount St. Elias (the ancient Marpessa), 2,500 feet above the sea. The island has long been celebrated for its quarries of white marble, situated about four miles east of Parikia, the chief town. The principal products are corn, wine and oil. Archilochus, the Greek poet, and Polygnotus, the painter, were natives. Pop., 9,000.

Parquetry, ornamental work composed of pieces of variously-coloured wood fitted closely together so as to form simple patterns. The lines of junction are generally straight. It is employed chiefly for floors, wainscots, and panels. Oak, the wood commonly used, makes an ideal floor for a ballroom or picture gallery.

Parr. [SALMON.]

Parr, CATHERINE, sixth and last queen of Henry VIII., was born in 1512, the daughter of Sir Thomas Parr, of Kendal, in Westmoreland. She was married when quite a girl to Edward Borough, after whose death she became the wife of Neville, Lord Latimer. After his death she had made up her mind to take as her third husband Sir Thomas Seymour (brother of Queen Jane), but was constrained, much against her will, to marry Henry VIII. at Hampton Court, on July 12th, 1543. She interceded successfully with him on behalf of his daughters, and favoured (in a discreet manner) the Reformed opinions. She was an accomplished classical scholar, and wrote a work called *The Lamentation or Complaint of a Sinner*. Not long after the king's death, she married her old suitor, Seymour, but died in child-bed at Sudeley Castle, Gloucestershire, on September 7th, 1548.

Parr, SAMUEL, scholar and teacher, was born at Harrow, Middlesex, on January 26th, 1746-7, and was educated at Harrow and Emmanuel College, Cambridge. After being some years an assistant-master at Harrow, he kept a school at Stanmore (which he started when disappointed of the headship of Harrow), and was afterwards head-master at Colchester and Norwich grammar-schools. The latter part of his life was spent at his vicarage of Hatton, Warwick, where he died. He was a good Latin scholar, a keen politician (being regarded as the Whig Johnson), and a conversationalist of some repute. Among his works were several volumes of sermons and also *Characters of the late Charles James Fox, selected and partly written by Philipatri Varricennis* (1809). Parr died at Hatton on March 6th, 1825.

Parr, THOMAS, commonly called OLD PARR, was born at Alberbury, Shropshire, England, in 1483. He was a small farmer in his native parish, but the circumstances of his life are not clearly ascertained, and even the date of his birth is uncertain. At the age of eighty he married his first wife, Jane Taylor—by whom it is said he had a son and daughter, who both died in infancy—and his second wife in 1605. News of his great age having reached Thomas Howard, second Earl of Arundel,

the art collector, he brought Parr to London and presented him to Charles I. as a "piece of antiquity." The excitement of the visit and the amount of feasting he went through proved fatal (his mode of life at home being simple and abstemious) and he died in Arundel House on November 14th, 1635, and was buried in the south transept of Westminster Abbey, where an inscription records that "he lived in ye reignes of Ten Princes, viz., K. Edw. 4, K. Ed. 5, K. Rich. 3, K. Hen. 7, K. Hen. 8, K. Edw. 6, Q. Ma., Q. Eliz., K. Ja., and K. Charles."

Parrakeet, a popular name for any small parrot with a long tail. Among the best-known are the Zebra Parrakeet (*Melopsittacus undulatus*), the Crested Parrakeet (*Nymphicus nova-hollandia*), the Rose-ringed Parrakeet (*Palaeornis torquatus*), and the Alexandrine Parrakeet (*Palaeornis alexandri*), said to have been brought to Europe by Alexander the Great.

Parramatta, a town of New South Wales, Australia, on the Parramatta, 14 miles W.N.W. of Sydney. It contains the old Government House, parks and recreation grounds, and several charitable institutions. The manufactures include woollens known as Parramatta cloth (first made at Bradford from wool exported hence), flour, tiles, candles, soap, and beer. Oranges (which may be seen on some of the largest trees in the world) and other fruits are successfully cultivated. Next to Sydney it is the oldest town in the state, having been founded in 1788, the year in which Captain Phillip landed. Its original name was Rosehill. Pop. (1901), 12,568.

Parrot, a name applicable to any bird of the group Psittaci, to which some systematists give ordinal rank, while others regard it as no more than a family. These birds are widely distributed, chiefly in tropical and sub-tropical regions, and have the bill large and powerful, much arched, and elongated at the tip, with the nostrils in the cere. The wing and tail are usually long; there are two toes in front and two behind. This group includes many widely-divergent forms—the Cockatoos, Macaws, Lories, Parrakeets, and the aberrant species from New Zealand, one of which, the Owl Parrot (*Stringops habroptilus*), is flightless, and another, the Kea, has developed carnivorous habits, though it has been stated that local expert opinion is not satisfied on the point. The plumage in the group is generally brilliant, green and red predominating; but some are soberly clad. The African parrot (*Psittacus erythacus*), probably the commonest cage-bird of the group, and certainly the one longest known, is bluish-grey, with the exception of the red tail feathers, while the black of *Microglossus aterrimus* is only lightened by some crimson on the cheeks. Parrots are remarkable for their power of imitating sounds, including human speech, but the Indian Myna is said to rival them in this accomplishment.

Parrot Fish, or PARROT WRASSE, belonging to the Labroid genus *Scarus* and some allied genera, so called from their brilliant coloration and the beak-like shape of the jaws. *Scarus* has nine

species from the tropical Atlantic and one (*S. cretensis*) from the Mediterranean. This last was known to the Romans and by them highly esteemed as a delicacy. The other genera, with about eighty species, are tropical and, though most of them are eaten, some acquire poisonous properties from their food, which consists of corals or fucus.

Parry, SIR CHARLES HUBERT HASTINGS, composer, was born at Bournemouth, Hampshire, England, on February 27th, 1848, and educated at Eton and Exeter College, Oxford. Though he began to compose at an early age, publishing two anthems in 1865, he entered Lloyd's next year. He soon, however, took up music seriously, studying at Stuttgart and especially under Edward Dannreuther. His first choral work, *Scenes from Prometheus Unbound*, was performed at the Gloucester Festival in 1880. With *The Glories of our Blood and State*, also produced at Gloucester (1883), Aristophanes' *The Birds* (Cambridge, 1883), and *Partita* (1883), for violin and pianoforte, he established himself as an exponent of the art, and since that date has strengthened his position and reputation by many scholarly works. Amongst these may be mentioned *Blest Pair of Sirens* (Bach Choir, 1887), *Judith* (Birmingham, 1888), *Ode for St. Cecilia's Day* (Leeds, 1889), *L'Allegro ed Il Penseroso* (Norwich, 1890), *De Profundis* (Hereford, 1891), *The Lotus Eaters* (Cambridge, 1892), *Job* (Gloucester, 1892), Aristophanes' *The Frogs* (Oxford, 1892), *King Saul* (Birmingham, 1894), *Invocation to Music* (Leeds, 1895), *Magnificat* (Hereford, 1896), *A Song of Darkness and Light* (Gloucester, 1898), *To Deum* (Hereford, 1900), *Æschylus' Agamemnon* (Cambridge, 1900), *Processional Anthem for the Coronation of Edward VII.* (1902), *Peace and War* (1903), *Voces Clamantium* (1903), *The Love that Casteth out Fear* (1904), and Aristophanes' *The Clouds* (1905). He succeeded Sir George Grove in the Principalship of the Royal College of Music in 1894, became Professor of Music at Oxford in succession to Sir John Stainer in 1899, was knighted in 1898 and promoted baronet in 1902.

Parry, SIR WILLIAM EDWARD, Arctic explorer, was born in Bath on December 19th, 1790. His father, a physician of repute, intended him for the medical profession, but he entered the navy in 1803. In January, 1810, he joined the *Alexandria* frigate and spent three years in Spitsbergen, where he studied astronomy and prepared charts of the Northern navigation. In 1818 he was appointed to the *Alexander*, in Sir John Ross's expedition in search of a North-Western Passage to the Pacific. They were unsuccessful. Though Ross thought the project hopeless, Parry was confident and obtained command of a new expedition. He sailed from the Thames in May, 1819, and reached Melville Island early in September, earning the reward of £5,000, offered by Parliament to those who should first pass the meridian of 110° W. within the Arctic circle. His two ships, the *Hecla* and *Griper*, returned in November, 1820, and the results were held to demand another expedition. In May, 1821, he started again, but after great hardships returned in the following year without success. A third expedition in 1824

was also unsuccessful, and after the wreck of one of his ships he returned in 1825. With the sanction of the Admiralty, in 1827, he sailed on a journey to the North Pole, which he proposed to reach from Spitsbergen with sledge-boats. Owing to the ice-drift his progress northwards was frustrated. Of these several journeys he published narratives. Along with Sir John Franklin he was knighted in 1829. In this year he went to New South Wales and returned in 1835. Appointed Governor of Greenwich Hospital, in 1853, Parry, who was twice married, died at Ems in Germany, on July 8th, 1855.

Parsees (*i.e.*, "Persians"), direct descendants of the old Persian Zoroastrians, who rejected Islām when the Arabs overran Persia in the 7th century. Some remained in the country, where they are called Ghebres (Ghebar), and where they form small communities chiefly in Yazd and Kerman, their total number not exceeding 9,000. The rest were expelled about A.D. 800, and after a short stay, first in Ormuz Island, at the entrance of the Persian Gulf and then in Deb (Diu) Island, on the Katiwar coast, finally settled on the Indian mainland, where their chief seats are Surat and Bombay, and where in 1901 they numbered 94,190, of whom 78,880 were in the Bombay Presidency, and 15,310 in the rest of India; they constitute a wealthy community, characterised by great solidarity and munificence, and are engaged chiefly in trade. Although now speaking Gujarati and English exclusively, their Persian origin is shown by their religion, unbroken traditions, and type; they are not fire-worshippers, as is popularly supposed, but venerate fire and the sun as the purest emblems of the Deity. Of the old Zoroastrian religion little is preserved except the symbols and formulas, the dualistic principle tending to merge in a vague deism, with truth and universal benevolence as the cardinal virtues. They live up to a high moral standard, are strict monogamists and treat their women with great respect. The dead are exposed in the Lakhma ("Towers of Silence"), where they are left to be consumed by the elements or by carrion birds.

Parsifal (that is, Percival), the hero of the Teutonic legend concerning the Holy Grail. He is the Galahad of the Arthurian legends. Richard Wagner's poem was based on the story as given by Wolfram von Eschenbach. It was published in 1877, the music was completed in 1879 and *Parsifal* was first performed as a whole, after the instrumentation had been finished, in 1882.

Parsley (*Carum Petroselinum*), an umbelliferous plant, widely cultivated, but of uncertain origin, though probably native in eastern Europe. In cultivation it is remarkable for its bright green, pinnately-divided and crisped leaves, which, besides being used as a flavour in melted butter and soups, are largely employed as a merely ornamental garnish to cold meat, butter, etc. A good deal of superstitious reverence attaches to this plant, which is believed to have been dedicated first to Selene, goddess of the dead, and afterwards

to St. Peter as door-keeper of Paradise. The fruit, the characteristic feature of the Umbelliferae, has five equal narrow ribs on each half, with an oil vitta between each and two on the commissure or face of contact with the other pericarp. It should be noted that Fool's Parsley, somewhat resembling true parsley in leaf and general aspect, is a plant of poisonous properties

Parsnip (*Pastinaca sativa*), a biennial plant of the natural order Umbelliferae, cultivated at least since the days of the Emperor Tiberius. It is a native of England, though not of Scotland, and also occurs in other countries of Europe and in North

however, he was ordained and entered the Society of Jesus. In 1580 he and Father Campion were sent to England on secret missionary service, Parsons arriving at Dover disguised as a soldier. He left England a year later, when Campion was arrested, and went to France. Between this time and the Armada expedition he was busy with political intrigues. Between 1589 and 1593 he organised several seminaries for English Roman Catholics in the Peninsula and France, and was himself for some time rector of the English College at Rome, where he died on April 15th, 1610. In his later years his influence with the Pope was violently assailed by the secular priests.



THE PARTHENON: TEMPLE OF ATHENA, ATHENS.

Asia. In the Channel Islands its conical tap-roots reach eighteen inches in length and four to five inches in diameter. They are cream-coloured, sweet and aromatic, but of less dietetic value than the potato. The leaves are once pinnate, with oval bright green leaflets, downy underneath when wild; and the flowers are yellow, and in large terminal, flat, compound umbels, on stems three or four feet high.

Parsons, ROBERT, Jesuit, was born at Nether Stowey, near Bridgwater, Somersetshire, on June 24th, 1546, and was educated at Taunton and St. Mary's Hall and Balliol College, Oxford. In 1568 he became fellow of Balliol and afterwards a tutor and dean. In 1574 he was compelled to leave the university on account of his opinions and went to Padua to study medicine. Eventually,

Parsonstown, or BIRR, a town of King's County, Ireland, on the Brosna, 72 miles W.S.W. of Dublin. Birr Castle, once the seat of the O'Carrolls, was granted by James I., in 1641, to Sir William Parsons, whose descendant, the 3rd Earl of Rosse (1800-67), the distinguished astronomer, constructed his famous telescope on the estate between 1827 and 1839. The town is handsome and well-built and contains a statue of the 3rd Earl of Rosse by J. H. Foley. It is also one of the few towns in which a statue was erected (1747) to the Duke of Cumberland, the "Butcher" of Culloden. Formerly noted for its manufactures, first of woollens and then of linen, it afterwards took up distilling with considerable energy and this, with ale, leather and flour, is still the chief industry. Pop. (1901), 4,355.

Parthenogenesis, the method of reproduction in which the ovum, or female element, can develop without being fertilised by a spermatozoon or male element. Such cases are comparatively rare, but occur among the Rotifers or Wheel Animalcules, the Crustacea, as in the so-called "summer ova" of Cladocera, and in the freshwater Branchiopod known as Apus; and among the insects, as in the Gall-flies (*Cynipidae*), the Plant-llice (*Aphidae*) and the worker bees and wasps.

Parthenon, the name given to the Temple of Athena at Athens, completed in 438 B.C., and built of white marble from Mount Pentelicus. It was designed by Ictinus and Callicrates, with the help of Pheidias, who made the colossal image of the goddess and superintended the sculptured decoration. It was 228 feet long and 64 feet high to the top of the pediment. During the Venetian siege, in 1687, the Turks, with characteristic barbarous indifference, used the building as a powder magazine with the result that, struck by a shell, the temple was reduced to its present ruined condition. It is in the Doric order, and the most perfect example of ancient Greek architecture. Many of the sculptures of the frieze are now in the British Museum among the Elgin Marbles.

Parthia, an ancient kingdom, forming part of what is now northern Persia, was bounded on the N. by Hyrcania, on the E. by Bactria, on the W. by Media and on the S. by the Iranian deserts. Its inhabitants came from Scythia and were subject to their neighbours until, in the middle of the 3rd century B.C., Tiridates incorporated Parthia with Hyrcania. Mithradates I. (171-38 B.C.) freed himself from all dependence on Syria and conquered Bactria, Media and Babylon. His successor repelled the attacks of his country's former suzerain, but Parthia soon afterwards became tributary to the Scythians. From the middle of the 1st century B.C. till the 3rd century of our era a long struggle was carried on with Rome. In 218 the Emperor Macrinus was not only defeated, but obliged to pay a heavy sum to the victors. The Parthian power came to an end a few years later, when Ardasher, the Persian, conquered it.

Partick, a town of Lanarkshire, Scotland, on the Kelvin, near its confluence with the Clyde, immediately to the north-west of Glasgow, of which it is a suburb. Although largely a residential quarter, its industries are of first-rate importance, the principal being ship-building, flour-milling, brass-founding, paper-staining, galvanizing and the making of hydraulic and weighing machines, besides bleachfields and cotton factories. The chief buildings are the Town Hall and numerous churches. In the Victoria Park, laid out as a memorial of Queen Victoria's Jubilee (1887) are preserved the relics of a fossil forest. Although forming part and parcel of Glasgow and using the Glasgow gas and water supply and enjoying many other privileges, Partick maintains a separate municipality. The town is of great antiquity. Morden, the Pictish king, contemporary with St. Mungo, lived in it and, in 1136, lands here were granted to

the see of Glasgow. Of the Bishop's palace no trace remains, but on its site George Hutcheson, one of the founders of Hutcheson Hospital in Glasgow, built himself a large mansion, which was not wholly demolished till 1836. For their services in supplying his army with bread at the battle of Langside (1568), the Regent Murray gave the "baxters" or bakers of Glasgow the flour-mills locally known as Bunhouse Mills. Pop. (1901), 54,274.

Particular Average, a term used in marine insurance to signify the contribution which underwriters must make in case of partial loss by unavoidable accident, such as perils of sea.

Partnership is the relation which subsists between persons carrying on a business in common with a view to profit (*Partnership Act*, 1890 s. (1) i.). Thus, persons who carry on together an undertaking of any kind, such as a cricket club, a political association, or any other enterprise of that description are not partners, because there is no business and no view to profit.

Anyone who receives or agrees to receive a share of the profits of a business is *prima facie* a partner; and is, therefore, liable for the debts of the concern. But the following classes of persons are not necessarily partners:—(1) Persons who own property jointly or in common, even if they share the profits arising from it—e.g., A and B own a house which they let to a tenant and share the rent; they are not, thereby, partners; (2) Persons who share the *gross* returns of a business; (3) A creditor who agrees to accept payment of his debt by instalments or otherwise out of the profits of a business; (4) A servant or agent who receives a share of profits by way of remuneration for his services; (5) The widow or child of a deceased partner who receives a share of profits by way of annuity; (6) The lender of money, *under a contract in writing*, signed by all the parties, who is to receive a share of profits by way of interest on his money; (7) The seller of a business who agrees to take a share of profits by way of payment for the goodwill. As to (6) and (7), if the owner of the business goes bankrupt, or insolvent, or dies insolvent, the lender of the loan or seller of the business cannot claim the loan or price of the goodwill until all other creditors for money or money's worth have been paid 20s. in the £.

The persons composing a partnership are called "the firm"; and the name under which the business is carried on is called "the firm-name." In England every partner is individually liable in an action for all the firm's debts. In Scotland the firm must be sued, though the decree or diligence may be enforced against each partner separately. In England, if one partner is sued for the firm's debt, and judgment is obtained against him, the other partners cannot be sued afterwards.

Every partner is an agent of the firm—that is, his acts and defaults bind the whole firm, so long as the acts and defaults are within the scope of the partnership business. There is an exception to this rule, namely, that if the partners have agreed between themselves to limit the authority of one or more of them, all persons dealing with the firm

who have knowledge of the limitation are bound by this knowledge. An example will clear this up:—The firm of A, B, and C trading as "X and Co." (three partners), give a bill at three months signed by A (without his partners' knowledge) in the firm's name of "X and Co." in favour of Jones. If X and Co. are a mercantile firm, the firm is bound to meet the bill, because mercantile firms habitually give bills. But if Jones knows that A, B, and C had agreed that all bills should be counter-signed by two partners and he has taken a bill signed by A only, the firm of X and Co. is not liable. A alone is liable. Again, if X and Co. are a firm of solicitors, they will not be liable, because it is not the usual course for such a firm to give bills.

Of course, if any firm actually authorise a partner to do a particular act, the whole firm is liable.

A new partner is not liable for any debt contracted before he became a member of the firm. On the other hand, a retiring partner remains liable for everything done or owing up to the date of his retirement. But it is possible to arrange with all those who have dealings with the firm to accept the liability and also to transfer all credits to the new firm, releasing the old partner.

As to the relations of partners between themselves, the great rule is that these are fixed by the partnership agreement. Such an agreement may be verbal, but it is better to be in writing. Unless otherwise agreed, all partners share equally in the profits, irrespective of their shares in the capital. They also share equally in the losses. If a partner lends money to the firm beyond his agreed share of the capital, he is entitled (if there be no agreement to the contrary) to 5 per cent. interest on it before profits are shared; but, unless otherwise agreed, no partner can claim interest on his capital.

The majority of partners govern in case of dispute, except that they cannot embark the firm in a new kind of business without the consent of all. Neither can the majority expel a partner, unless the partnership agreement expressly empowers them to do so. Every partner is entitled to manage the business and to have access to the books and accounts. No partner may use the firm's property for his private purposes, nor may he engage in any competing business. Should he do so, he must hand over to the firm all the profit he makes.

A partnership is dissolved (unless otherwise agreed) by the death or bankruptcy of any partner. And the Court may decree a dissolution for any of the following causes:—(1) The lunacy of any partner; (2) The permanent incapacity of a partner; (3) Such misconduct by a partner as is calculated prejudicially to affect the carrying on of the business; (4) Wilful and persistent breaches of the partnership agreement; (5) When one partner so conducts himself as to render it not reasonably practicable for the others to carry on business with him; (6) When the business can only be carried on at a loss.

When the partnership is for a fixed period, it is dissolved when the time expires. If no period is fixed, any partner may give notice to dissolve. If the partnership agreement is by deed, the notice must be in writing.

On a dissolution, every partner has the right to require that the whole assets of the firm shall be realised: that (1) all liabilities shall be paid first to outsiders; (2) that each partner shall be repaid any bonus; (3) that each partner shall be repaid his capital; and (4) that the balance be divided according to the proportion of profits to which each partner is entitled. All losses, including deficiencies in capital, are to be paid, (1) out of profits, (2) out of capital, and (3) by the partners individually according to the proportion of profits they would have been entitled to.

Partridge, a bird of the gallinaceous genus *Perdix* of the Grouse family (*Tetraonidae*), with three species, ranging over the Continental Palearctic region. The name is also applied to the birds of the genus (or sub-genus) *Caccabis*, distinguished by a rudimentary spur, and is sometimes extended to the sub-family *Perdixinae*, which includes the American Partridge and the Quail. In



THE PARTRIDGE
(*Perdix cinerea*).

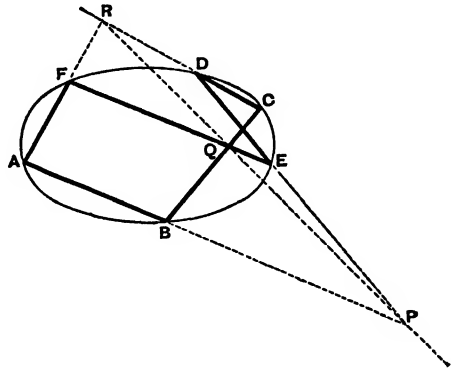
these birds the legs are bare and the nostrils naked, with a horny skin on the upper margin. The Common Partridge (*P. cinerea*) is a well-known British game bird, with a close time from February 1st to August 31st. The male is about 12 inches long and the female somewhat less; the head and throat are light yellowish chestnut; breast bluish-grey, freckled with blackish-brown, and on the lower part a brownish-red horseshoe or crescent, which is much smaller, or absent, in the hen-bird. The sides are barred with chestnut, and the back marked with brownish-black lines or brownish-yellow and grey. These birds frequent open and cultivated ground and are rarely found in woodland; they feed on grain and seeds, insects and their larvæ, ants' "eggs"—really the pupæ—and, when these fail, clover or any tender leaves. The flight is rapid, but never high or long-sustained; it consists of several quick strokes to give impetus and then the bird skims along with extended wings. Pairing takes place about February. The nest is usually a hollow in the ground and contains from ten to sixteen eggs, yellowish-brown in colour, and the young come out in July. Both parents employ stratagem to attract strangers away from the nest or young brood. Game-preservers often hatch partridge eggs under hens and the young are reared

on ants' "eggs." The Red-legged or French Partridge (*Pardiz*, or *Caccabis rufa*), native in southern Europe, has been naturalised in East Anglia, where it is said to have almost driven out the native species.

Pascal, BLAISE, mathematician and philosopher, was born at Clermont-Ferrand, department of Puy-de-Dôme, France, on June 19th, 1623. When he was seven years old his father, who was his teacher, went to live at Paris, where the child gave evidence of his powers by writing an Essay on Conic Sections at the age of sixteen. The family went to Rouen, where his father was appointed intendant, in 1641; and here Pascal first came into connection with the Jansenists and underwent his first "conversion." In 1647 he published *Nouvelles Expériences sur le Vide* and in this year was visited at Clermont by Descartes. In 1650 he returned to Paris, published his *Discours sur les Passions de l'Amour* and saw much society, until his second "conversion," four years later, from which time he began to be much at the convent of Port Royal and to lead an ascetic life. Early in 1656 he undertook the defence of Arnauld, the leading member of that house, who had been condemned for his Jansenism by the Sorbonne, in the first of the *Lettres à un Provincial*, which was written under the pseudonym "Louis de Montalte." It was followed by 17 others. As time went on, Pascal became more and more ascetic. His health had always been poor and he died in Paris on August 19th, 1662, worn out by hard study and severe discipline, having barely reached middle age. Pascal was equally great as a mathematician and as a philosopher. He solved the problem of the quadrature of the cycloid and founded the doctrine of probability; and by the experiments which he planned on the Puy-de-Dôme, first showed that the height of the mercury column in a barometer decreases when it is carried upwards through the atmosphere. His *Lettres Provinciales* (inaccurately so called) are equally admirable for their logic, their lightness of touch, and their inimitable style, which delighted Bossuet and Voltaire alike. The posthumous *Pensées* have been claimed by some as a sketch of an intended apology for Christianity; while others, like Victor Cousin, have discovered in them proofs of the possession by the writer of a most daringly sceptical mind.

Pascal's Theorem was enunciated when its author, Blaise Pascal, was only a boy of sixteen, and first appeared in a short essay published in 1640. It states that if a hexagon be inscribed in a conic the intersections of opposite sides are three points in a line. This line is called the Pascal line. Any six points may be chosen, and they may be taken in any order to form a hexagon; hence, the hexagon may assume the most curious shape, quite different from the convex figure occurring in Euclidian geometry. In the adjoining figure $A B C D E F$ is the hexagon; the opposite sides $A B$ and $D E$ meet at P , $B C$ and $E F$ meet at Q , while $C D$ and $F A$ meet at R . The points $P Q R$ are seen to be colinear, $P R$ being the Pascal line. Those same six points may be taken in many different orders, giving, in fact, as many as sixty different hexagons

with a Pascal line for each. If five points $A B C D E$ are given they are sufficient completely to determine the conic which shall pass through them; hence, if any line be drawn through one of these points— E , for example—we can from Pascal's theorem find a point F on this line which shall



also lie on the conic. Since this can be repeated any number of times, we can obtain any number of points on the conic and so be enabled to draw the curve.

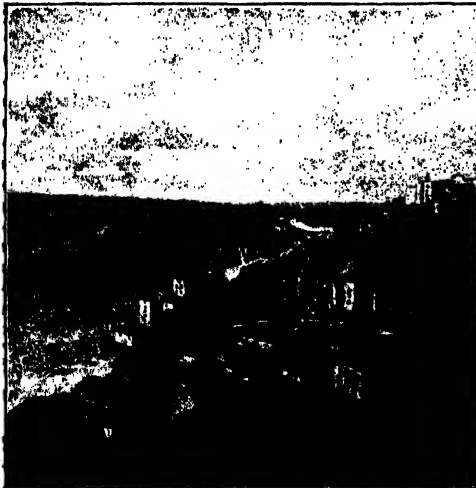
Pas de Calais, a maritime department of North France, bounded on the N. and W. by the Strait of Dover, on the N.E. and E. by Nord, on the S. by Aisne, and on the S.W. by Somme. It was formed in 1790 out of nearly the whole of Artois and the northern seaboard of Picardy, and has an area of 2,606 square miles, with a coast-line of 80 miles. The country is level on the whole, nowhere rising more than 700 feet above the sea, and, though containing many sand dunes, possesses well-cultivated tracts of great fertility. The principal streams are the Lys and Scarpe, flowing eastwards to the Scheldt, the Aa to the North Sea, and the Liène, Canche and Authie to the English Channel. The chief crops are wheat, rye, barley, potatoes, mangolds, beetroot and tobacco. Fruit, especially apples, is extensively grown. The live-stock comprises sheep, cattle, pigs, horses and goats. Though the coalfield is much the richest in France, the iron and steel industries are not pursued with proportionate enterprise. The other industries include distilling, sugar-refining, tanning, lace-making and glass-works. Boulogne (49,083) and Calais (59,793) have commodious harbours, where fisheries and ship-building are prosecuted. Arras (25,813) is the capital. Pop. (1901), 949,968.

Pasha, a title of high rank in Turkey and Egypt, used after the proper name, formerly pertaining to Turkish princes of the blood, now conferred on high civil or military officers. Military pashas used to be distinguished by standards of one, two, or three horse-tails, according as they were generals of brigade, of division, or in command. The word used to be also found in the form *busha* (w).

Paskevitch, IVAN FEDOROVICH, general, was born at Pultowa, Russia, on May 19th, 1782, and, having entered the army, became a lieutenant in 1800. He served against the French in Austria, and in 1812—in which year he was promoted general—in defence of his own country, and also in the War of Liberation. For his services as commander-in-chief in the Persian War he was created Count of Erivan (1828). After serving with distinction in the Turkish War which followed, he—now field-marshal (1829)—reached the height of his reputation by putting down the Polish rising of 1831, after which he was made Prince of Warsaw and Governor of Poland. In 1848 he assisted Austria against the Hungarians, and forced Görgei to surrender at Vilagos in 1849. In honour of his 50 years' military service he was appointed field-marshal in the Prussian and Austrian armies. His last command was in 1854 on the Danube, when he was wounded at Silistria and retired. He died in Warsaw on February 1st, 1856.

Passamaquoddies, North American Indians, a branch of the Algonquian family, who formerly occupied the coast land about the New Brunswick and Maine frontiers, where the name still survives in Passamaquoddy Bay and river. Here a small group lingered till about the year 1825, when they appear to have died out.

Passau, a town in Bavaria, close to the Austrian frontier, at the confluence of the Inn and Ilz with the Danube, 92 miles E.N.E. of Munich. Most of the town lies on the tongue of land between the Danube and the Inn, the streets ascending in terraces. The town has been a fortress and an episcopal see since the 8th century, and has



PASSAU.

belonged to Bavaria since 1803. It possesses a cathedral, bishop's palace and town hall; and manufactures leather, boots, paper, porcelain, parquetry

floors and mirrors. Passau tiles are made at Oberzell, 8 miles to the east. In 1552 an important agreement between German Roman Catholics and Protestants was signed at Passau. Pop. (1900), 18,583.

PASSION-FLOWER
(*Passiflora*).

Passenger Pigeon (*Ectopistes migratoria*), a native of temperate North America. The tail is very long, graduated and pointed. The male is about eighteen inches in length; the upper parts are generally blue, with metallic gloss on the neck; the under surface is brownish-red. The female is a little smaller and her plumage less brilliant. The flesh is valued for the table. The migrations of these birds are undertaken in search of food.

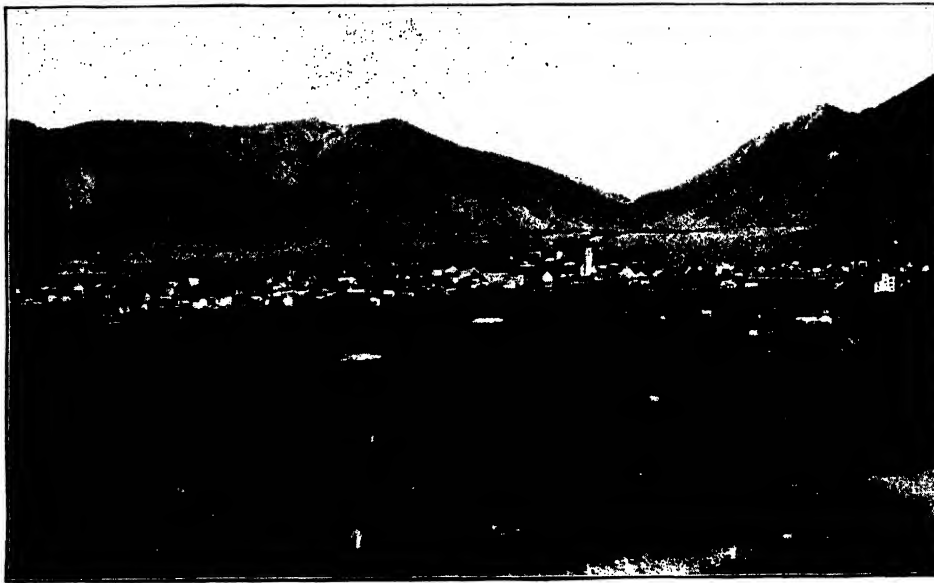
Passerine Birds, PASSERIFORMES, PASSERES, an order of Carinate birds, the limits of which differ somewhat in different classifications. Dr. Bowdler Sharpe has enumerated the sections and families in his article on Birds (q.v.).

Passion-flower (*Passiflora*), the typical genus of the calycifloral order Passifloraceae, mostly climbing plants with unbranched tendrils and scattered leaves, native of warm climates, especially America. They were so named by Jesuit missionaries, who traced in them detailed symbols of our Lord's Passion. The palmately-lobed leaves are the outspread fingers of the mocking multitude; the tendrils, the scourges; the ten segments of the perianth, the Apostles in the absence of Peter and Judas; the ring of coloured hair-like processes or corona, the crown of thorns or the aureole; the five anthers splitting longitudinally, the five wounds; and the three clavate stigmas, the three nails. The corona is connected with insect-pollination, the pollen being thrown upon it by the extrorse anthers. Both stamens and ovary are carried up on a gynandrophore and the

stalked nuculane has a hard rind and numerous seeds, embedded in a fleshy, edible, but mawkish pulp. Many species are grown for their beauty and hybrids have been produced. The fruits of *P. quadrangularis*, the granadilla, are brought to market occasionally. Those of *P. macrocarpa* sometimes weigh as much as eight pounds.

Passion Play, Oberammergau. Oberammergau is a village of Upper Bavaria, lying in the valley of the river Ammer, whence it derives its name. It is 2,760 feet above the sea level, and some 45 miles to the south-west of Munich, the capital of Bavaria, with a population of 1,400

degree to the "Black Death" which devastated England in the Middle Ages, made its appearance in the district. While, however, whole villages were depopulated by its ravages, Oberammergau remained untouched and, to make their apparent safety still more secure, the inhabitants placed guards round the place, forbidding ingress to any person who came from the infected neighbourhood. In spite, however, of these precautions, one Kaspar Schuchler, an Oberammergauer, working at Eschenlohe, a few miles distant, where the plague was raging, resolved to visit his wife and children at his native village. Eluding the vigilance of the sentinels, he succeeded in entering Oberammergau,



OBERAMMERGAU.

[Photo: B. Johannes, Partenkirchen.]

persons, whose principal industry is wood-carving. Since 1899 the village has been accessible by train from Munich *via* Murnau and Kohlgrub. The chief interest of Oberammergau lies in the Passion Play performed here every tenth year. The earliest mention of a Mystery or Passion Play at the village dates back as far as the 12th century, but of this no authentic record exists. It appears, nevertheless, highly probable that the people, like those of the neighbouring hamlets, had for many centuries been accustomed to give slighter representations of sacred subjects in that dramatic form which subsequently culminated in the wonderful Passion Play which, in later decades, has attracted the attention, not only of Europe, but of the whole civilised world.

The date of the first performance of the present play may be definitely fixed as the year 1633, when a terrible pestilence, corresponding in a remarkable

but with him came the germs of the dreaded pest and within a week, he, his wife, and little ones, with many others, became victims.

A few more days increased the death-roll to such an extent that the people, thus threatened with extermination, took counsel of their parish priest, and after confessing their sins, made a solemn vow that if the Almighty would, in His mercy, restrain His chastening hand, they would ever thereafter, at certain periods, solemnly enact, to the best of their ability, the sufferings and death of Jesus. Thereupon, it is said, their prayer was heard; those who were dying, recovered; no more went to the grave; the plague was stayed, and the survivors, thus saved from death, remembering their compact, began that series of representations of the Passion of Christ which have been continued at intervals of ten years down to the present time without intermission, save for some unavoidable cause, such as

the Franco-German War of 1870, when the principal performers had to render service in the Bavarian Army.

The original play was, on the suggestion, it is stated, of the then Archbishop of Salzburg, remodelled a century since by the monks of the neighbouring Monastery of Ettal, in accordance with the requirements of a more refined age, and finally attained its present high standard in the early part of the 19th century under the fostering care of the good Pastor Daisenberger, the parish priest, and Rochus Dedler, the schoolmaster and organist of Oberammergau, the latter rearranging the music and adding many numbers of his own composition. Rehearsals of the play take place for eighteen months before the first public performance, the women of the village making nearly all the robes worn by those who take part in it. The selection of the performers is in the hands of a committee of elders, their choice falling only on those natives of Oberammergau who are conspicuous for their exemplary character, this condition being strenuously insisted upon. The honour of being chosen for a part is keenly appreciated, and much sought after by all the inhabitants. The play is given two or three times a week from May to September, with an additional representation when necessary, which constantly happens, owing to the enormous and continuous influx of visitors from all parts of the world.

The representations are given in the closing year of every decade, as in 1890, 1900, 1910, and so on. The play begins at eight in the morning, and continues until five in the evening, with an hour's pause at midday for rest and refreshment. About 450 men, 50 women, and 200 children (some only twelve months old) take part in the performance. The theatre seats 4,000 persons, and whilst the auditorium since 1900 has been roofed in, the stage itself, as of old, is entirely open to the air, the performance being given regardless of the weather. The proscenium is set back a considerable distance from the edge of the stage, the band being in a position similar to that in an ordinary theatre, and out of sight. The music and singing, though of a simple nature, are of a pathetic character, and are rendered in a deeply impressive manner. The play itself is divided into two parts, a tableau of an appropriate Old Testament scene being given before each of those acts which depict the principal events of Christ's life immediately preceding His death, as described in the New Testament. The performance is considered by those who give it, as a most solemn act of reverence to God, and is conspicuous throughout for the dignity and pathos with which it is rendered by all concerned, the result having at times a most remarkable effect upon the vast audience. In addition to the actual players, a chorus of 14 men and 23 women forms an important feature of the representation, corresponding very much to that in the ancient Greek plays, whence it undoubtedly had its origin. It is the duty of the chorus to sing at intervals, sometimes in unison, sometimes in parts, of the chief events represented as the play progresses. Their leader is termed the Chorus, a villager of imposing appearance and resonant voice being

selected for the part. Occasionally, whilst a tableau is shown, the chorus, grouped on each side of the stage, unfold in song the inner meaning of that which is thus typified. They are attired in magnificent robes of brilliant and picturesque hues, which, however, are changed for black garments immediately before and after the scenes symbolising and depicting the pathway of the Cross and the Crucifixion.

The pecuniary results, after payment of expenses and the nominal salaries of the performers, are entirely devoted to charitable objects. Formerly Oberammergau could only be reached by train to Murnau, and then by a drive or walk of four hours over the pass leading to the village. Since the extension of the railway to the heart of the place has rendered cheap day trips from Munich possible, there is, of course, some risk that commercial innovation will do much to destroy the rustic simplicity and primitive circumstance which have been the charm of this little Bavarian village and its wonderful Passion Play, shut off, as it seemed, from the outer world by the mountains and hills which encompass about this interesting and romantic spot.

Passive Resistance. The movement known by this name was due to the Nonconformist revolt against the Education Act of 1902, the purpose of which Mr. A. J. Balfour said, in introducing it, was to make the local education authority master of the whole scheme of secular education in every elementary school. School Boards were to be abolished and the former distinctions of Board and Voluntary Schools were to give place to the titles "provided" and "non-provided." In the Voluntary Schools, the body of managers was to consist of four appointed under the trust-deed and two by the new authority, the popularly-elected County Councils. These managers were to maintain the buildings, of the estimated value of £25,000,000. The cost of education (salaries, material) was to be defrayed partly from the Imperial exchequer and partly by the local rates. The head-teacher was required to be a member of the denomination to which the school belonged. These proposals provoked strong opposition. The Nonconformists protested that the whole cost of denominational schools, apart from the fabrics, was thrown on public funds; that efficient control was not secured; that, in effect, it was a new endowment of the Church of England; that religious tests were perpetuated, and that the Anglicans would obtain a monopoly of educating the children. Refusal to pay the Education rate was threatened and when the Bill (which the leader of the Nonconformists vehemently described as "this accursed Bill") became law, although among educationists there was a large body of opinion in its favour, it met with determined opposition in many quarters. Resistance was organised on two lines—"passive resistance" to the payment of the proportion of the rate estimated as required for the non-provided (denominational) schools, and, in Wales, by the refusal of the County Councils to discharge the functions placed upon them by the Act in regard

to these schools. It was said that the object and result of these Acts (a supplementary Act dealing with London was passed in 1903) "was to enable Catholics and Anglicans to triumph over Nonconformists." Holding these views, thousands of Nonconformists consistently submitted to be summoned, goods were distrained, and many persons went to prison. On the return of the Liberals to power in 1906 a new Bill to amend these grievances was introduced which, in its turn, was threatened with active opposition by the supporters of the denominational schools. This Bill, however, had hardly been passed by the House of Commons when the Court of Appeal (the *West Riding of Yorkshire County Council v. the Board of Education*) on August 8th, 1906, decided by a majority that educational authorities were within their rights in disallowing payment for religious teaching in non-provided schools. This decision, however, which justified the attitude taken up by passive resisters, was, on appeal to the House of Lords, unanimously reversed (December 14th, 1906).

Passover (a translation of the Hebrew [פסח, *PASSE*]), the name of the great festival of the Jewish Church, celebrated on the evening of the 14th day of the month Abib or Nisan in commemoration of the Exodus and more particularly of the "passing over" by the Destroying Angel of the Israelites' houses marked with the blood of the paschal lamb, when the Egyptians were smitten with the death of their first-born. At this festival every householder partakes with his family of the paschal lamb and unleavened bread. The Christian Easter has been made concurrent with it.

Passport, a certificate of identity and nationality, etc., issued from the Foreign Office of his country to a person about to travel, and countersigned by the representative of his country in the states he purposes to visit. The document has to be shown on demand to the local authorities, and claims aid and protection for the bearer. Originally the word meant a written permission to pass through a port into the town or country to which the port belonged. Hence, passports for goods, which relieve them from the usual duties, are still issued, and ships may have passports for their freight. The term is also applied to the certificates of identity and domicile without which the natives of some countries, such as Russia, may not travel in their own country, and which the police can at all times ask to see. A few countries—such as Great Britain, the United States, Sweden—have ceased to demand passports in ordinary circumstances, but in some—as Russia and Turkey—passports are imperative. The charge for a passport of the British Foreign Office is two shillings. The safest plan for tourists and others travelling on the Continent, in the East and elsewhere is to provide themselves with passports (which must be signed immediately they are received) before they leave their own country. By adopting this simple precaution great inconvenience (especially in respect of such things as registered letters, money orders, and even telegrams) will be avoided.

Pasta, GIUDITTA, singer, was the daughter of an Italian Jew named Negri, and was born at Saronno, near Milan, on April 9th, 1798. Her first appearances on the operatic stage were not successful, but at Verona in 1822 the tide turned, and from 1825 to 1833 she sang with much applause in Paris, London and other cities. Her best impersonations were *La Sonnambula*, *Medea*, *Semiramide*, and *Giulia*. Vincenzo Bellini is said to have written *Norma* expressly for Pasta. Her powerful and somewhat heavy voice, which only cleared after the first scenes, had a range of two octaves and a half. From her retirement in 1840 till her death on April 1st, 1865, she resided in her villa on Lake Como.

Pastel is a species of painting executed with soft crayons of various colours. Though the use of pastel probably originated in the 17th century—a pastel in the Louvre dated 1615 is among the earliest known—the great pastel epoch was undoubtedly the 18th century. The work of Latour, Chardin, Greuze, Rosalba, Boucher, Nattier, Proudhon, to be seen in the galleries of the Louvre, testifies to the excellence and popularity of the pastels done at that period. Considering these works it is impossible to find any justification for Grimm's dictum expressed when corresponding with Diderot that "Everyone agrees that pastel is hardly worthy the attention of a great painter." Pastel was also practised in Germany at this time by Raphael Mengs, whose work may be seen in the Museum at Dresden, which also possesses 157 pastels by Rosalba. In England the work of Russell and of Cotes may be noticed, though pastel was not much in use in Great Britain at that period, owing to the popular but erroneous notion that it was an evanescent medium, an opinion which prevailed up to the latter half of the 19th century, when, however, pastel began to be better understood, and, in 1880, the Pastel Society held its first exhibition. The Society was reconstructed in 1899 and has numbered many distinguished artists among its contributors, amongst them G. F. Watts, E. A. Abbey, J. M. Swan, Sir J. Guthrie, J. J. Shannon, W. Rothenstein, E. Stott, and others. In France the *Société des Pastellistes Français* was formed in 1885. Its original members included Puvion de Lavannes, Besnard, Hellen, Cazin, and R. Ménard, who were afterwards joined by such famous artists as Blanche, Chéret, Forain, and La Touche. Pastel possesses many advantages over other methods of painting. Being always dry, a work in pastel may be abandoned and resumed at the will of the artist; moreover, it has, for the same reason, nothing to fear from, though also nothing to gain by, the use of any medium such as oil or varnish. With reasonable care, such as any other work of art would require, it should be as permanent as any painting executed either in oil or water-colour. When properly used it is capable of great artistic charm, but its misuse results in the complete nullification of its possible beauties. Pastel is essentially the medium of a colourist and is particularly adapted for the reproduction of fresh, soft, delicate, dainty, and mysterious, as also brilliant effects. Its aim is not to give, nor is it

capable of giving, the effect of an oil-painting, but for rendering the grace and charm in the portrait of a woman it is unequalled. Pastels are made from pigments which have been washed and prepared and mixed with chalk, clay, gum mucilage, etc. The materials required are soft and semi-hard pastels, and specially prepared paper or canvas. The soft pastels are mainly used for the preliminary sketching-in and for the ground-work of the painting, though they may be employed up to the finish. The harder pastels are used to give definition and the finishing touches. It is important not to use the harder pastels too soon, as an effect of dryness would then be produced. In selecting pastels those of a soft and velvety appearance should be preferred to those which look hard and gritty. The papers used are of various kinds, differing as to the roughness or softness of their surface, but the student will learn from experience which surface is most suitable for his work. "Pumicif" paper, prepared with pumice - powder mixed with starch, is perhaps better than any other, and is capable of being much worked upon. "Anti-ponce" paper is less rough and is used principally for portraits. Other papers have a soft, fluffy surface. Canvas specially prepared with plaster may also be used. Many of the 18th-century masters used a coarse, unprepared, greyish-blue paper. The method of using pastel is very simple, but presupposes a previous knowledge of drawing on the part of the student. The paper is stretched on a board and the subject sketched in with soft pastels. The colour is obtained more by the juxtaposition of different tones than by the mixing of them. Two tones may be united by rubbing with the finger, though much rubbing is not advisable, since it destroys the brilliancy of the painting. The pastel is carried as far as possible in this manner, and the harder pastels are then used to give the final and definite touches. Pastel may be removed with the aid of a paint-brush when corrections are necessary. Pastels can be fixed, though it is not necessary nor always desirable. A good plan is to fix the work before the pastel is quite finished, as any dullness caused by the fixatif may be corrected. A good fixatif is that invented by the French artist, H. Laeaze. Pastel is sometimes used in drawings when the aim is simply to give a note of colour, as in some of the drawings by Whistler, Lhermitte, and Degas, but its full beauty is obtained when used as a method of painting. In the latter manner it has been, and is, extensively used by Cazin, Besnard, Blanche, Picard, Iwill, Lévy-Dhurmer, and many others in France; by Wauters and Knopff in Belgium; by Segantini in Italy; by Lenbach and Stück in Germany; by Thanlow in Norway; and in England by the artists mentioned above and others.

Pasteur, Louis, chemist and bacteriologist, was born at Dole, in the department of Jura, France, on December 27th, 1822, and was educated at Besançon and Paris. At first he seemed disposed to follow an artistic career, but he took to science and especially chemistry and laboratory work with avidity. After holding chairs at Dijon, Strasburg, and Lille, in 1867 he became Professor of Chemistry

at the Sorbonne. As early as 1856 he had received the Rumford Medal of the Royal Society for his researches in connection with the polarisation of light. He discovered the existence of a micro-organism in impure tartrate of lime, and showed that other fermentations were due to similar organisms. He also turned his attention to diseases of silkworms, and investigated the fermentations of beer and wine. For these experiments and the practical remedies which he proposed



LOUIS PASTEUR.

as their outcome, Pasteur was in 1874 awarded an annuity of 12,000 francs by the French Assembly, with reversion to his widow and children. Subsequently he made researches on the subject of hydrophobia, and suggested inoculation as a cure. His experiments in the phenomena of putrefaction confirmed the doubt as to the possibility of the demonstration of the theory of spontaneous generation. In 1882 Pasteur was chosen a member of the Académie Française, and four years later the Pasteur Institute was established in Paris. He died at Villeneuve-l'Étang (Seine-et-Oise), near Paris, on September 28th, 1895, and was interred at the Pasteur Institute three months later. The brilliance as well as the enormous practical value of his researches was recognised universally. He was made F.R.S. in 1869; in 1870 Napoleon III. had nominated him to the Senate but war broke out before the decree was published; in 1881 he received the Grand Cross of the Legion of Honour; and in 1892 his 70th anniversary was celebrated at the Sorbonne in presence of the President of the Republic. Among his works were *Nouvel Exemple de fermentation déterminée par les animalcules infusaires pouvant vivre sans oxygène libre* (1863); *Études sur les vins* (1866); *Études sur le vinaigre* (1868); *Études sur la maladie des vers à soie* (1870); *Études sur la bière* (1876); *Microbes organisés* (1878); and *Traitement de la Rage* (1886).

Paston Letters, a collection of letters and papers pertaining to the Paston family, of Paston, in Norfolk, dating from the reign of Henry V. to the end of the reign of Henry VII., of which four

volumes were published by Sir John Fenn, 1786-9, and a fifth was edited by Sir John's nephew, Mr. Sergeant Frere, in 1823. These papers were sold by William Paston, second and last Earl of Yarmouth, became part of the Le Neve collection, and then passed through two hands before their purchase by Fenn. Most of the originals mysteriously disappeared for a long time, but those of the third and fourth volumes were found at Roydon Hall, near Diss, a mansion of the Freres, in 1875, while those of the fifth volume had been discovered ten years before at the house of Mr. Philip Frere, son of the Sergeant, in Dungate, Cambridgeshire. During the search for the documents other unpublished letters came to light and these were collected and edited by James Gairdner. The Paston Letters afford valuable illustrations of history, law, and manners.

Pastor, a genus of Starlings, with a single species (*P. roseus*), from Western Asia. The head is crested, and the general plumage is bluish-black with some pink on the back and under-surface. They are sometimes called Locust-birds, from their fondness for these insects.

Pastoral Poetry, poetry delineative of rural life under idealised conditions. The pastoral poems of Theocritus are described as idylls, those of Virgil as eclogues (meaning elegant selections), but this distinction does not admit of explanation, as the themes are similar. The idyll, "a little picture" chiefly of rustic life, attained in Tennyson's hands an extended meaning by the introduction of romantic incidents. *Idylls of the King* are the divisions of an epic. Bion and Moschus with Theocritus take first rank as pastoral poets. Their subjects are the singing matches of herdsmen, love-songs, heroic myths and idylls of fisher life. Virgil reproduced in Latin the music of the Greek and reveals his love of home, of nature and the decent passion of rustic folk. Then interest in country life languished until the 15th century. In 1573 Tasso's *Aminta* revived the successes of the classic poets. While Sanazzaro, Cervantes and Richelieu wrote pastoral romances, during the 16th century English poets also found their choicest inspiration in country scenes. Spenser's *Shepherd's Calendar*, Sidney's *Arcadia*, Lodge's *Wolslynde* (a prose tale on which Shakespeare based *As You Like it*), Ben Jonson's *Sad Shepherd* and Fletcher's *Faithful Shepherdess* belong to this period. From the melancholy of Milton's *Lycidas* to the *Pastorals* of Pope is a sharp transition. Pope is artificial, but his wit and polish are always delightful. Gay's *Shepherd's Week*, Allan Ramsay's *Gentle Shepherd*, and Thomson's *Seasons* convey something of the charm of rustic ways, but are deficient in the pathos and simplicity of Burns's *Cotter's Saturday Night*, an idyll full of lifelike touches of the beauty of homely affection. Rustic realism also characterises the *Poems in the Dorset Dialect* of William Barnes, a lyric writer of genius, who has been considered not unworthy of comparison with Theocritus. Tennyson's *English Idylls* includes some of his choicest poems.

Pastoral Staff, a staff denoting authority, borne by, or before, prelates, abbots, and abbesses. In the Greek Church the head is generally in the form of a T-cross, which sometimes has the arms turned up to form a crescent. In the Western Churches the head is cruciform, or the staff is a conventional representation of a shepherd's crook. The scarf often attached to this staff was called the *sudarium*.

Pasture, land on which cattle, horses and sheep graze; meadow land. The phrase "permanent pasture" specifically excludes arable land on which cattle graze when it lies fallow, or when green crops have been sown for food. The term is sometimes applied to the herbage on which live-stock feeds.

Patagium, the membrane arising from the sides of the body and connecting the fore and hind limbs in the flying lemurs, flying squirrels, etc. It acts as a natural parachute, and by its aid these animals are enabled to take long leaps from a height downwards.

Patagonia, the southernmost part of the continent of South America. It is broadly divided into two parts, both south of 39° S. The part east of the eastern crest of the Andes, and including the eastern half of the island of Tierra del Fuego, separated from the mainland by the Strait of Magellan, belongs to Argentine; the part west of the western crest of the Andes, and including the western half of Tierra del Fuego, belongs to Chile. The area of the Argentine portion may be roughly estimated at 225,000 square miles; that of the Chilean portion at 90,000 square miles. This division of the country has obtained since 1881. Magellan discovered Patagonia in 1520, and late in the 16th century Sarmiento da Gamboa founded Spanish settlements at Nombre de Dios and San Felipe (now Port Famine), and about the same time Drake was in these regions. Further explorations were made by Davis, Narbrough, and Falkner; while, later still, Fitzroy, Darwin, and Masters contributed to a fuller scientific knowledge of the country. Patagonia is about 1,000 miles long, and nearly 500 broad in the widest part. Eastern Patagonia consists, except in the immediate neighbourhood of the rivers, of barren undulating plains, occasionally varied by rocks and salt lakes. Close to the Andes, however, there is some fertile land. The chief rivers, which all flow eastwards, are the Negro, the Chubut, and the Chico. Large inlets on the eastern coast are the Gulf of St. Matias and the Gulf of St. George. The climate for a great part of the year is dry. Horses and cattle are bred in some regions. The fauna includes the guanaco, viscacha, puma, fox, skunk, rheu (American ostrich), condor, hawk, and vulture. The seaboard of Western Patagonia is extremely indented, and is lined by a series of islands, of which Chiloe, the Chonos Archipelago, Wellington, Hanover, the Adelaide Archipelago, and Santa Ines are the chief. The climate here is very moist, rain or snow falling in the south nearly every day. Among the chief Andean peaks are Minchinmadiwa and Corcovado, two volcanoes between 7,000 and

8,000 feet high; Monte San Valentín, nearly 12,700, and Chalten, a volcano over 7,000 feet. Good timber is obtained from the mighty forests and some coal is found. At Punta Arenas (Sandy Point) Chile has a penal settlement. Pop. of Eastern or Argentine Patagonia (that is, the provinces of Neuquén, Río Negro, Chubut and Santa Cruz) estimated at 28,000; of Western or Chilean Patagonia (that is, the provinces of Magallanes Territory, Chiloé, and Llanquihué) at 160,000.

Patagonians, South American aborigines, who are thinly scattered over the pampas of Argentina from about the Río Negro to the extremity of the continent, and who are represented in Tierra del Fuego by the Onas. The Patagonians, so called by Magellan from the large feet (*patagon*) of the animal-skins enveloping their legs, call themselves Ahonicanca or Chonek in the north; Inaken, Huaycuru, or Piyochu, in the south; and all have now generally adopted their Araucanian name, Tehuelche (i.e., "South-Easterners"), in reference to the position of their domain south-east of Araucania (South Chile). Physically they differ little from the normal American type, except in their larger stature, the mean being little, if at all, under 6 feet. Although the reports of travellers vary considerably on this point, there can be no doubt that the Patagonians are the tallest people in the world, exceeding the Eastern Polynesians, the Zulu Kaffirs, and all other Africans on an average by at least two inches. The head, also, is very large, massive, and brachycephalic (round), from which it appears that they are not the aborigines of the pampas region, the remains of their predecessors being distinguished by small dolichocephalic (long) heads and short frames, like those of the present Fuegians. The Patagonians are essentially wild nomads, living in *toldas* (tents), tilling no land, keeping no domestic animals except the horse since its introduction from Europe, and depending for their subsistence entirely on fruits, herbs, roots, and game, especially the guanaco and rheu, which they pursue on horseback, and capture with the bola and lasso. They speak a stock language of highly polysynthetic structure, but in other respects entirely distinct from Araucanian and all other American tongues. They worship Ashekenat-Kanet, a great spirit, author both of good and evil, and believe in an after-life, where all will enjoy everlasting happiness: hence with the dead are buried all those objects that may be of use to them beyond the grave. The Patagonian domain is being slowly encroached upon by Argentine and Chilean settlers and their tribes number scarcely more than 25,000.

Patan, a town of Baroda, India, 65 miles N.W. of Ahmadabad. The manufactures include swords, spears, pottery, silk and cotton. The town occupies the site of the ancient Anhilwara and is one of the oldest and most famous in Gujarat. A dynasty of Rajput kings, from 746 to 1194, made it their capital and it maintained its importance during the period of Mussulman power. Pop. estimated at 38,000.

Patan, a town of Nepal, India, immediately south by east of Khatmandu, from which it is

little more than 1 mile distant. But for the handsome main square in the centre of the town, the appearance of Patan would be shabby and dirty in the extreme, although it is said to be older than the capital. The streets are narrow and offensive and Buddhist temples in various stages of decay are numerous. Pop., 40,000.

Patchouli, the volatile oil distilled from the leaves and shoots of *Pogostemon Patchouli*, an undershrub belonging to the order Labiata, and native to Sylhet, Malacca, and Penang. It is used in India to scent tobacco, hair-oil, shawls, and Indian-ink, and in Europe for sachets and other perfumery.

Patella, the genus of Lamellibranchiata including the common limpet.

Patent, Patent Right. A patent right is a privilege granted by the Crown to the first inventor of any new contrivance in manufactures, so that he alone shall be entitled during a limited period to benefit by his own invention. It is so called because the instrument by which it is bestowed is always in the form of letters patent, which is the established mode of royal grant. To confer on any individual the exclusive right of carrying on a particular trade or manufacture is in general beyond the lawful bounds of the royal prerogative, but an exception has always been made in favour of inventors of new manufactures, because with regard to them grants of exclusive privilege for a reasonable period, while they tended to encourage useful ingenuity, encroached on no right of which others were already in possession. In accordance with this principle the Statute of Monopolies, passed in the reign of James I., excepted from its general declaration against monopolies all letters patent for the term of fourteen years or under, by which the privilege of sole working or making any new manufactures within the realm, which others at the time of the grant were not using, was granted to the true or first inventor thereof, so long as "they be not contrary to law, nor mischievous to the State, nor to the hurt of trade, nor generally inconvenient." Since this statute no patent right can be valid unless it come within the terms of the above exception. Therefore no patent right can be legally granted in the first instance for more than fourteen years, the subject must be "a new manufacture within the realm," and it must be an article fabricated by the hand of man, though a patent may be taken out not only for an entire article, but for an addition by way of improvement to one already existing, or even for a chemical process of production. The above statute has also added as a condition that it must be such as "others at the time of granting such letters patent shall not use." If a patent, therefore, be granted for an article already used or known or communicated to the public, whether the prior use or discovery be known to the patentee or not, the grant will be void. But, on the other hand, it is sufficient that it be new within the realm of Great Britain and Ireland at the time the patent is granted. Moreover, the previous notoriety of the

article in a foreign country is no objection to the validity of the patent, and the grant also can be made only to the "true or first inventor," the word inventor implying some exertion of ingenuity and some difficulty surmounted, so that when the new manufacture is of an obvious character, requiring no skill or contrivance for its production, it is not the fit subject-matter of a patent. As to being the true or first inventor, no one can claim this character if it appear that the novelty in question was first suggested to him by some other person in the United Kingdom; yet where the secret is acquired abroad by one who afterwards introduces it into Great Britain, he is considered by law as the true inventor, for it is immaterial whether the benefit bestowed on the public be the result of a man's travel and observation or the fruit of his original genius. In the case of two simultaneous discoveries, he who first procures a patent before the matter is made public is entitled to the privileges it confers. As to obtaining a patent, the application is made by petition contained in and supported by a solemn declaration that the petitioner is the true and first inventor, and that the invention is not in use in the United Kingdom by any other person, to the best of his knowledge and belief. The application, which must be left at (or sent to) the Patent Office, London, must be accompanied by either a provisional or a complete specification; the provisional specification describing the nature of the invention and being accompanied in general by drawings illustrative thereof, and the complete specification particularly describing and ascertaining the nature of the invention and in what manner it is to be performed or put in use, and being accompanied in general by drawings illustrative thereof, or else referring to the drawings thereof which accompanied the provisional specification. The complete specification, if not left with the application, must be sent not later than nine months (extendable) from the date of the application, otherwise the application is taken to have been abandoned. The application is then referred to the Comptroller of Patents, who inquires and reports thereon. By the Patents Act, 1902, official examination of the records for a period not exceeding 50 years was provided for, with a view to ascertaining whether or not a proposed new patent were really entitled to protection. The fees in connection with the obtaining of patent rights in the United Kingdom were once notoriously high and therefore repressive if not prohibitive; but the tendency of progressive legislation and administration is to offer inventors reasonable facilities for placing their inventions before the public, while at the same time securing them in their just and lawful rights.

Pater, WALTER HORATIO, essayist, philosopher and scholar, was born at Shadwell, London, on August 4th, 1839, and was educated at King's School, Canterbury, and Queen's College, Oxford. His family was of Dutch extraction, and his father a medical man. At first he thought of taking holy orders, but had to abandon the notion. Making his home in Oxford he read with private pupils,

and was elected fellow of Brasenose in 1864. Becoming keenly interested in philosophy and aesthetics, he contributed to the reviews a variety of articles afterwards published in book form as *Studies in the History of Renaissance* (1873). In 1885 appeared his masterpiece, the romance of *Marius the Epicurean*, followed by *Imaginary Portraits* (1887), *Appreciations, with an Essay on Style* (1889), and *Plato and Platonism* (1893), the last being his college lectures. He died in Oxford on July 30th, 1894.

Pater Noster, the Lord's Prayer, so-called in the Latin Church from the first two words of the Vulgate version, meaning "Our Father." The term is also applied to the large beads which appear at intervals in a rosary—every eleventh bead is of this description—at the telling of which the prayer is repeated, and hence it is used of the rosary itself.

Paterson, capital of Passaic county, New Jersey, United States, on the right bank of the Passaic, 17 miles N.W. of New York. The falls (72 feet in height) on the river above the town afford a plentiful supply of power, which is utilised by the many important factories. The silk industry is the largest in the Union, and other industries include the making of locomotives and bridges, cotton and woollens, linen, carpets, velvets, and iron goods. Pop. (1900), 105,171.

Paterson, WILLIAM, founder of the Bank of England, was the son of a farmer at Tinwald, Dumfriesshire, where he was born in April, 1658. He was trained to commerce in England, and spent a good deal of time in travelling to push whatever business he happened to have on hand, going for several years to the West Indies in this capacity. Returning to London about 1685, he soon made a fortune in trade, was instrumental in forming the Hampstead Water Company in or about 1690, and in 1694 founded the Bank of England. Personal jealousies and his plan for forming an Orphans' Bank soon compelled his retirement from the directorate, and he then went to Edinburgh, where he elaborated his scheme for the settlement of the isthmus of Darien in South America. Towards the Scottish Africa and India Company then formed £300,000 was subscribed in England and £400,000 in Scotland. Dissensions among the directors and fraud on the part of some *employees*, however, boded ill for the future of the enterprise, and international complications also arose which compelled the English Government to withdraw its support. Paterson sailed with the expedition in 1698 and witnessed the disastrous collapse of the undertaking. When he returned to London (1701) William III. invited his advice on several financial projects and, after the king's death, he actively promoted the negotiations for the union of Scotland and England. He died at Westminster in 1713.

Pathans. [AFGHANISTAN.]

Pathology (Greek, *pathos*, "disease"), the science which deals with life under abnormal conditions. In former days this science was for the most part limited to the study of symptoms and

treatment, but within the last century there have been considerable additions to the knowledge of the anatomy of disease, the naked-eye appearances and the tissue changes revealed by the microscope having been studied carefully. The subject of pathological chemistry has also grown up, and the study of physiology, which deals with animal functions in health, has greatly modified the notions concerning diseased processes. The germ theory, moreover, has led to many new developments in pathology. The science deals with such subject-matter as Atrophy, Hypertrophy, the various forms of Degeneration, Tumour-formation, Inflammation, and the relation of parasites to disease.

Patiala, or **PUTTIALA**, a native state of the Punjab, India, lying to the south of the Sutlej. It has an area of 5,951 square miles. In the hilly country in the north-east lead and copper are mined and marble is quarried. Considerable tracts are under various kinds of grain. Dacoity was prevalent in the latter half of the 18th century, but the Mahrattas aided the rajah in suppressing the brigands. The maharajah of Patiala sided with the British in the Nepalese war of 1815, and in the Sikh campaign in 1845-6, and remained loyal in the Mutiny. The capital is Patiala (pop., 55,785). Pop. of state (1901), 1,586,030.

Patmore, **COVENTRY KERSEY DIGHTON**, poet, was born at Woodford, Essex, England, on July 23rd, 1823. His father, Peter George Patmore (1786-1855), an author of some repute, was a friend of William Hazlitt and Charles Lamb. From 1847 till 1868 Patmore was on the staff of the British Museum. After that time he lived in retirement first at Hastings and then at Lynnington, where he died on November 26th, 1896. In 1844 he published a volume of minor poems, and in 1850 contributed to the Pre-Raphaelite magazine, *The Germ*. In 1853 appeared *Tumerton Church Tower and Other Poems*, and in the following years the four parts of the poem which was published as a whole in 1866 as *The Angel in the House*, and which is universally regarded as his masterpiece. In 1877 *The Unknown Eros and Other Odes* was issued.

Patmos, or **PATINO**, an island of the Aegean Sea belonging to the Sporades group, about 20 miles S. of Samos. The surface consists mostly of barren rock, but it is inhabited by some 4,000 Greek sponge-fishers. In the Middle Ages its palms gained the island the name of *Palmosa*, but under Turkish rule vegetation and trade inevitably diminished. The ancient monastery of St. John the Divine at the top of a mountain commemorates the exiled author of the Revelation. It was founded in 1088 under Alexius Comnenus by St. Christodoulos. Half-way up the hill is the Cave of the Apocalypse, traditionally supposed to be the spot where St. John saw the visions he narrated.

Patna, the chief city of Patna District, Bengal, India, on the right bank of the Ganges, 140 miles E. of Benares. Its ancient name was Pataliputra, and it was called Palibothra by Megasthenes, the

Greek historian, who visited it in the 4th century B.C. After the massacre by Mir Kasim in 1763, it was annexed by the British East India Company. In 1786, a *gola* or granary, a high dome-shaped storehouse, was erected by Government, but has seldom been used. Patna is of great commercial importance. Salt, rice, cotton, oil-seeds and spices are exported, and there are several opium factories in the place. The chief buildings are the mosque of Sher Shah, the shrine of Shah Arzani, Patna College, and a Mohammedan college. In 1857 a mutiny broke out at Dinapur, a military station in the environs. Pop. (1901), 135,172. The **DISTRICT OF PATNA**, with an area of 2,076 square miles, had a pop. in 1901 of 1,623,856; whilst the **DIVISION OF PATNA**, extending on both sides of the Ganges and including the districts of Patna, Gaya, Shahabad, Saran, Champaran, Muzaffarpur, and Darbhanga, has an area of 23,675 miles and a pop. (1901) of 15,811,014.

Patna, a feudatory state in the Chhatisgarh division of the Central Provinces, India. It has an area of 2,399 square miles. It is an undulating plain for the most part, rising here and there into ridges. The chief rivers are the Tel, Ong, Suktel and Sundar. Rice, pulse, oil-seeds, sugar-cane and cotton are cultivated. Dense forest and jungle surround the town of Patna for several miles, infested with tigers (man-eaters being common), bears, leopards and buffaloes. Iron-ore occurs, but is not regularly worked, and the manufactures are insignificant. Pop. (1901), 277,566.

Paton, **SIR JOSEPH NOEL**, painter and poet, was born in Dunfermline, Fifeshire, Scotland, on December 13th, 1821. He studied at the Royal Academy, London, and in 1845 gained, with his "Spirit of Religion," one of the three premiums awarded in the Westminster Hall competition for designs to decorate the Houses of Parliament. In 1846 he exhibited at the Royal Scottish Academy his "Quarrel of Oberon and Titania," the companion picture of the "Reconciliation" being shown in Westminster Hall in 1847. Both paintings are now amongst the popular favourites in the National Gallery, Edinburgh. In 1847 he was elected an Associate and in 1850 a full member of the Royal Scottish Academy. Chief among his other pictures are "The Pursuit of Pleasure" (1855), "Dawn—Luther at Erfurt" (1861), "Mors Janua Vitae" (1866), "Faith and Reason" (1871), and "Lux in Tenebris" (1879). He also illustrated *The Ancient Mariner*, *The Water Babies*, and *Lays of the Scottish Cavaliers*, and published two volumes of admired verse, *Poems by a Painter* (1861) and *Spin-drift* (1867). He became Queen's Limner for Scotland in 1866, was knighted in 1867 and received, in 1878, from Edinburgh University the degree of LL.D. He had one of the finest collections of arms and armour in Scotland. Sir Noel died in Edinburgh on December 26th, 1901.

Patras, or **PATRÆ**, a seaport and chief town of the department of Achaia and Elis, Greece, on the Gulf of Patras, 70 miles W.N.W. of Corinth. It became an archiepiscopal see in the 4th century,

and has been from a very early date an important fortress. It was twice besieged by the Spaniards in the 16th century, and played an important part in the Greek War of Independence. It was much injured by an earthquake in 1820. From its harbour, which was greatly improved in 1880, enormous quantities of currants are exported, in addition to olives, olive oil, figs, sultanas, citrons, valonea, tobacco, wine, lamb, goat and kid skins. Pop. estimated at 41,000.

Patriarch, the title both in the Eastern and in the Latin Church of metropolitan bishops of the highest rank, the Pope only excepted. The title was applied to the heads of the Jewish Sanhedrim after the captivity, and originally to the founders of the Hebrew race—Abraham, Isaac, Jacob, and his children—and also to the antediluvian heads of families mentioned in Genesis.

Patrician, a member of the superior order of citizens in ancient Rome, which order consisted of the families of the early *pateres* or senators. The title was conferred by the later Roman emperors as a distinction, without regard to its original meaning. It was occasionally borne by sovereigns and dignitaries in the Middle Ages.

Patrick, ST., the Apostle of Ireland, was born at Kilpatrick, Dumbartonshire, Scotland, in 373. His name was originally *Sucat*, and his father, a Scot, was a magistrate under the Romans. When sixteen years old, Patrick was carried off in a raid of Picts and Scots and sold to an Irish chief named Miluic, who lived in Antrim near Broughshane. Six years afterwards Patrick escaped to France, and lived as a monk at Tours and at Lerins. In 405 he went as a missionary to Ireland. Landing in Wicklow, he went north to County Down, where he converted a chief named Dichu, who gave him Sabhall, or Saul, his first church. He next preached at Tara before Laoghaire (Leary), the king, and thence visited northern Connaught and parts of Ulster. His preaching was highly successful, and in the course of about twenty years he is said to have baptised 12,000 persons and founded more than 300 churches. It was he who made Armagh the metropolitan see of Ireland. Patrick died, probably at Antrim, in 463, and pilgrimages were long wont to be made to his tomb. Many places in Ireland bear his name. The *Book of Armagh*, in Trinity College Library, Dublin, contains St. Patrick's *Confessions*.

Patrick, ORDER OF ST., the Irish Order of distinction formed on February 5th, 1783, by George III. It comprises the sovereign, the Lord-Lieutenant of Ireland for the time being, and twenty-two knights. The motto of the Order is "Quis Separabit?" and the initials K.P. indicate membership. The ribbon is sky-blue in colour.

Patrick, SIMON, theologian, was born at Gainsborough, Lincolnshire, on September 8th, 1626, and educated at Gainsborough Grammar School and Queen's College, Cambridge. Taking holy orders, he became rector of St. Paul's, Covent Garden, London, in 1662, where he remained for

nearly thirty years. Charles II. made him a royal chaplain in 1671, "whether he would or no," and in 1679 he was appointed Dean of Peterborough, which he held along with his living. In 1689 he was consecrated Bishop of Chichester, and in 1691 was transferred to Ely, where he died on May 31st, 1707. He was a voluminous writer, among his chief works being *The Parable of the Pilgrim* (1664), paraphrases of several books of the Old Testament (afterwards published in ten volumes as a Bible commentary from Genesis to the Song of Solomon), and *Advice to a Friend* (1673).

Patripassians, the name of one of the first anti-Trinitarian sects which arose in the 2nd century. It signifies that the Father, Creator of all things, became incarnate and suffered for man's redemption, and denies the distinction of Persons in the Godhead. Praxeas taught there is but one Divine Person; that to recognise three Personalities is to infer three Gods; that identity of Persons is essential to the Divine Monarchy, all titles of Deity in Holy Scripture applying to the Father alone. In safeguarding the unity of the Godhead, Praxeas' successor, Noëtus, of necessity held that the Father Himself became His own Son, Who, at the Crucifixion, commended His Spirit unto Himself. This teaching developed into Sabellianism, to which, for some years, all who dissented from the Church rallied.

Patron, originally a Roman patrician in his relation to his clients—i.e., to his freedmen and such of the commonalty as were under his protection; hence a saint who is regarded as the special protector and benefactor of a person or persons, a family, a nation, a town or a class. Ecclesiastically, a patron is the person who holds the advowson of a benefice.

Patteson, JOHN COLERIDGE, first missionary Bishop of Melanesia, was born in London on April 1st, 1827, and educated at Ottery St. Mary, Eton, and Balliol College, Oxford. Shortly after he had taken holy orders, he fell under the influence of George Augustus Selwyn, Bishop of New Zealand, and accompanied him to Auckland in 1855. Devoting himself to mission work in the Melanesian islands, he became Bishop of Melanesia in 1861. His life was one of unwearied devotion both to the spiritual and physical wants of the natives; but he ran many risks in consequence of the bitter feeling aroused by the slave trade that went on between the planters of Queensland and Fiji and the islands. To this infamous traffic his death on September 20th, 1871, was due, for he was murdered by the inhabitants of one of the Santa Cruz group, who apparently mistook his ship for that of a kidnapping party.

Patti, ADELINA MARIA CLORINDA, singer, the daughter of an Italian vocalist, was born at Madrid, Spain, on February 19th, 1843. A precocious child, she was singing in public in New York at the age of seven, but was prudently withdrawn from the concert-room and given over to serious study for several years. After producing a favourable

impression as Lucia at New York in 1859, she made her *début* at Covent Garden as Amina in 1861, and her brilliant success in this and other rôles speedily established her reputation. To a voice of extreme flexibility and astonishing brilliance she united



ADELINA MARIA FLORINDA PATTI,
(B. Loure, Nice.)

histrionic gifts of unusual excellence, and was, during many years, the world's *prima donna* in lighter Italian opera. She was enthusiastically received in Paris, Vienna, St. Petersburg, and other European capitals, as well as in North and South America, and her performances in oratorio and concert were always exceptionally popular. She married the Marquis de Caux in 1866 (divorced, 1885); the tenor Ernesto Nicolini (1834-98) in 1886, and Baron Cederström in 1899. Her sister, CARLOTTA PATTI (born at Florence in 1840; died at Paris, June 28th, 1889), was also an accomplished singer, though somewhat overshadowed by Adelina's fame, and was prevented by slight lameness from appearing much in opera. In 1879 she married Ernst Munk, the violoncellist.

Pattinson's Process, the method which is usually adopted for desilverising lead, and which is so effectual that silver, if present in the lead to the extent of only two or three ounces to the ton, may be profitably extracted. The process depends on the fact that when argentiferous lead is melted and allowed to cool the portions that solidify first are not so rich in silver as the still liquid portion. Hence, the lead is melted in a number of pots arranged in line, each about five or six feet across. The crystals solidifying first are laded out and passed into the pot on the right until two-thirds of the lead has been so transferred, the remainder being passed to the left. By this means at the extreme left a highly argentiferous lead is obtained, from which the silver is obtained by cupellation. The process is named after its discoverer, Hugh Lee

Pattinson (1796-1858), the metallurgical chemist. So general did it become that in Germany the verb "pattisoniren," and in France the noun "pattinsonage" were devised in reference to the process.

Pattison, MARK, scholar and philosopher, was born at Hornby, Yorkshire, on October 10th, 1813, and educated by his father, a strict Evangelical, first at Hornby and afterwards at Hawkswell. He matriculated at Oriel College, Oxford, in 1832, and was elected to a fellowship at Lincoln College in 1839. At this period he belonged to the advanced wing of the Tractarian party, and showed his theological bent by twice gaining the Denyer prize (1841-2). He translated for Pusey's *Library of the Fathers*, and followed Newman on his retirement to Littlemore, but "did not share in the crash of 1845." In his reaction from the Oxford Movement he was drawn as forcibly towards latitudinarian views as he had previously been in the opposite direction, and his life henceforward is a history of ever-widening efforts after intellectual culture. His work at Oxford was retarded for ten years by his failure to obtain the rectorship of his college (Lincoln) in 1851, but after his election in 1861 he again devoted himself to University reform. He also took a deep interest in education generally, and acted on the Duke of Newcastle's Commission of Inquiry into Elementary Education, publishing a *Report* (on Germany) in 1859. His books, few in number, are remarkable alike for their deep erudition, earnest thought, and vigorous style, the best known being *Isaac Casaubon* (1875) and the life of *Milton* (1879) which he wrote for the "English Men of Letters" Series. His *Memoirs*, too, are an interesting autobiography. He died at Harrogate on July 30th, 1884. His sister, DOROTHY WYNDELOW PATTISON ("Sister Dora") (1832-78), became widely known and loved in the Black Country during the thirteen years (1865-78) she laboured as hospital nurse at Walsall.

Pau, capital of the department of Basses Pyrénées, France, situated on the right bank of the Gave de Pau, 58 miles E.S.E. of Bayonne. It stands on the edge of a plateau 623 feet above the sea, commanding a magnificent view of the Pyrenees to the south. Pau was the ancient capital of the kingdom of Béarn. The castle, which was the birthplace of Henri IV., is a noble building flanked by six square towers, one of which is 113 feet in height. Bernadotte, afterwards Charles XIV. of Sweden, was also born at Pau. The importance of the town is now mainly due to its celebrity as a health-resort, especially in the winter. Chocolate, cutlery, and linen are manufactured. Hams and Jurançon wine are also produced. Pop. (1901), 30,811.

Paul, ST., originally SAUL, the great apostle of the Gentiles. He was born at Tarsus, in Cilicia, a town famous as a place of education and made a free city by the Emperor Augustus in recognition of the fact that its inhabitants in the Civil Wars had espoused the cause of Julius Cæsar. The claim which the apostle successfully asserted on several occasions to Roman citizenship depends, however,

not on this, but on other circumstances which we can only conjecture. To his early education at Tarsus may be traced the acquaintance with Greek literature which his writings occasionally exhibit. Cilicia was celebrated for its breed of goats, the hair of which was employed at Tarsus in various manufactures; in particular, tents were made with it, and we find St. Paul, after his conversion to Christianity, described as by trade a "tent-maker." This fact throws no light upon the social status of his parents, or his own early circumstances, for it was customary in the wealthiest Jewish families for children to be taught a trade. He himself tells us that he was a Hebrew of the Hebrews, of the tribe of Benjamin; and that he had been "brought up at the feet of Gamaliel," the wisest as well as the most tolerant of Jewish rabbis. From this we may infer that he had migrated early in life to Jerusalem. His enthusiastic temperament had not been responsive to the milder influences of his teacher, Gamaliel, whose counsel to the Sanhedrin was to leave the Christian movement alone. Saul, on the contrary, first appears in history as the young man who took care of the outer garments of those who were stoning to death the first Christian martyr, St. Stephen. Soon after this, armed with powers from the Jewish authorities at Jerusalem, he set out with a band of followers, intending to seize and bring to Jerusalem converts to the new faith at Damascus; but as he neared that city, a light from heaven snote him to the earth, and blinded him for a time, and he heard the voice of the Saviour: "Saul, Saul, why persecutest thou Me?" He was taken into Damascus, where, by Divine command, a Christian convert visited him, on whose coming Saul received his sight and was baptised. He now joined himself to the Christian community at Damascus, and even preached Christ in the synagogues. From Damascus also he visited some part of Arabia, returning to the town once more. The Jews attempted his life: but from the window of a house which was built on the city wall he was let down by night in a large network fishing-basket, and so made his way to Jerusalem, where his attempt to join himself to the Christian society there was at first received with suspicion, until Barnabas spoke for him and vouched for his conversion and his zeal. At Jerusalem, as at Damascus, his desertion of their side and ardent espousal of the other brought him into danger from the hands of the Jews, and he returned for awhile to his native Tarsus. Thence he was fetched by Barnabas to the Syrian Antioch to aid in the Christian movement there, and with Barnabas he carried relief to the believers at Jerusalem who were suffering from a famine. After their return to Antioch the apostle's missionary history begins. He and Barnabas, with Mark, Barnabas's cousin, went to Cyprus, where they, in spite of the opposition of the sorcerer Elymas, converted the Roman proconsul, Sergius Paulus. At this time it is that Saul begins to be called by the Gentile name of Paul by the sacred historian. Thence the three went to Perga, in Pamphylia, where Mark deserted them. From Perga, Paul and Barnabas went to the Pisidian Antioch, where St. Paul's preaching encountered strong opposition from the Jewish leaders

—resulting, first, in his preaching only to the Gentiles in that place, and at last in his expulsion with Barnabas. Thence they came to Iconium and, being again endangered, passed to Derbe and Lystra, in Lycania. At Lystra St. Paul's healing of a cripple led to an attempt on the part of the heathen inhabitants to worship him and his companion as gods. After other vicissitudes, the missionaries ended their first journey by returning to the Syrian Antioch. Thence they were sent to Jerusalem, in consequence of an attempt by teachers to impose the rite of circumcision upon Gentile converts, and returned with an ordinance from the church there practically exempting such converts from the ceremonial part of the Mosaic law. St. Paul next undertook a second missionary journey; but Barnabas wishing to take Mark once more, St. Paul dissented, on the ground of his previous desertion. In consequence, the former associates parted company; St. Paul started this time with Silas. He revisited Derbe and Lystra; there they took up the young Timothy, went through Phrygia and Galatia, and, prevented by some Divine monition from going, as they had designed, to the southern shores of the Euxine, they found themselves at Troas, on the west coast of Asia Minor. Here St. Paul had the vision of a man of Macedonia, saying to him: "Come over and help us." They therefore crossed the Egean Sea. At Philippi, as they went to the Jewish meeting-place by the river's side, St. Paul cast out the evil spirit from a possessed damsel who cried after them, and thus deprived her employers of a source of gain, in consequence of which a stir was raised against the missionaries, and they were beaten and cast into prison by the authorities. While in prison they consoled themselves with hymns. The vivid story of the earthquake, the panic of the Philippian gaoler, his conversion, and the calmness and courage of the apostle and his companion, must be read in the Acts of the Apostles (chap. xvi.). It was here, in a town proud of its own immunities as a "Roman" colony, that St. Paul first asserted his claim as a freeborn Roman citizen, whom it was a crime to beat or to cast into prison uncondemned. Proceeding to Thessalonica, Paul and Silas made further converts, but departed in consequence of tumults there, leaving the nucleus of a church, to which, shortly afterwards, St. Paul wrote his earliest extant Epistle. St. Paul's work at Berea, the next town visited, was disturbed by emissaries from Thessalonica; he went, leaving Silas and Timothy behind him, to Athens, where, amid the works of art there in process of restoration, he saw an altar with the inscription, "To some god unknown." This he took for the text of his wonderful address to the Stoics and Epicureans who met to hear him in the Areopagus. He made but few converts here, and went on to Corinth, a great commercial centre, through which passed the traffic between the Eastern and Western world. Here he was joined by Silas and Timothy, and preached fervently, first in the Jewish synagogue, and then, when his teaching was rejected, to the Gentiles. He converted, however, Crispus, the chief ruler of the synagogue; and this and other instances of his

power led the Jews to bring him before Gallio, the Roman procurator of Achaia, brother of the philosopher Seneca, who refused to deal with such matters, as entirely out of his jurisdiction. Thus, having founded a church—partly Jewish, partly Gentile—at Corinth, St. Paul went away to Ephesus, whither, after a brief visit to Jerusalem, he returned again, to stay for more than two years; until his success in turning the inhabitants from the practice of magic arts and the worship of the goddess Artemis, to whom the famous temple, the pride of their city, was dedicated, roused a tumult against him, from which he escaped, and went once more into Macedonia, and revisited the churches which he had founded on the European continent. From Corinth he purposed to depart by sea, but his Jewish enemies lay in wait for him, and in consequence he returned through Macedonia, and from Philippi sailed to Thracæ. Anxious to reach Jerusalem for the feast of Pentecost, he took ship again, only breaking his journey to meet, at Miletus, the elders of the Ephesian church, of whom he took an affecting farewell. At Tyre St. Paul and his companions landed, and there, and again at Cæsarea, he received prophetic warning of the dangers that awaited him at Jerusalem. Nevertheless, he went fearlessly on his way. Arrived at his destination, he adopted reasonable precautions to show his own respect for the Mosaic law and his desire that Jewish converts should observe it; but, in spite of this, an outcry was raised against him within the Temple precincts, which he was falsely accused of desecrating. He was rescued by the interference of the Roman soldiery in the garrison hard by, the tribune in command of which would have had him questioned under the scourge, but that he once more asserted that he was a "Roman." The tribune then brought the apostle before the chief priests, hoping thus to discover the truth about this *emete*. St. Paul, in his pleading, adroitly divided his antagonists by pointing out that he was called in question on that doctrine of the resurrection which the Sadducees, in opposition to the Pharisees, rejected. Once more rescued by the tribune from Jewish hands and from a conspiracy of which timely discovery was made, St. Paul was next sent as prisoner to Cæsarea, to be tried before the proconsul Felix. His defence enlisted the sympathy of his judge, who heard him further on the faith of Christ, and trembled when he reasoned of "righteousness, temperance, and judgment to come." Yet St. Paul remained a prisoner for two years longer, when Felix was succeeded by Festus, who heard the case again. On this occasion St. Paul appealed to the Roman emperor—a request to which the Roman governor, after once more (with Herod Agrippa, the Jewish tetrarch) giving him a hearing, was compelled to accede. It was necessary, therefore, that the prisoner should be sent to Rome. Of his voyage thither and shipwreck on the island of Malta we have a vivid account in the 27th chapter of the Acts of the Apostles. At Rome the prisoner was treated with consideration, being allowed to live in a sort of free custody with the soldier to whose charge he was given. He addressed his Jewish brethren in the

city, endeavouring to dispel the prejudices against him, and during this, his first imprisonment, probably wrote his letters to the churches at Philippi, Colossæ, Ephesus, and to his friend Philemon on behalf of the fugitive slave Onesimus. That he was set at liberty, and visited the scenes of his apostolic labours again, only, however, to become a prisoner at Rome once more, is a necessary inference from passages in his Epistles to Timothy and to Titus, which only this supposition will explain. St. Paul was small in stature, with some physical deformity—his "thorn in the flesh"—the nature of which can only be conjectured. Concurrent tradition affirms that he was beheaded at Rome in the reign of the Emperor Nero. It is supposed that he was born a little later than that Saviour whom he so faithfully preached.

Paul of Samosata, a heresiarch of the 3rd century, was born at Samosata, the capital of Commagene, on the Euphrates. He became Bishop of Antioch in 262, and was supported in his heresy by Zenobia, Queen of Palmyra, who made him her chief minister. After the defeat of Zenobia by the Roman emperor Aurelian, in 272, Paul was deposed. His heresy consisted in denying the distinction of the three Persons of the Trinity.

Paul, the name of five popes. PAUL I. succeeded his brother Stephen III. in 757, and ruled till his death on June 28th, 767. He cultivated friendly relations with Pepin the Short, King of the Franks. A pious, virtuous man, he received the honour of canonisation. PAUL II. (PIETRO BARRO) was born at Venice on February 28th, 1418, and became Pope in 1464, in succession to Pius II. He was a vain man, and devoted his attention chiefly to the embellishment of his court and the investing of his see with the aspect of magnificence. He treated men of learning with singular harshness, possibly foreseeing the incompatibility certain to arise between the new birth of letters and the papacy. He died suddenly on July 28th, 1471. PAUL III. (ALESSANDRO FARNESE) was born on February 28th, 1468, and succeeded Clement VII. in 1534. Although he was a dissolute and self-seeking prelate, he showed both zeal and prudence in the measures he took to subvert Protestantism. In 1540 he gave his sanction to the Jesuit order, and in 1545 convoked the Council of Trent. He issued a bull excommunicating and deposing Henry VIII. (1538), and refused to end the religious struggle in Germany by countenancing the Interim of Charles V. He died on November 10th, 1549. PAUL IV. (GIOVANNI PIETRO CARAFFA), born on June 28th, 1476, succeeded Marcellus II. in 1555. He was conspicuous before his accession for his ascetic life and his zeal for reform, and, as Pope, strenuously endeavoured to enforce his views of clerical duty and public morality. At the same time he was determined in his opposition to all that he conceived to be heresy, establishing the Inquisition at Rome and issuing the first Index Expurgatorius. He died on August 18th, 1559. PAUL V. (CAMILLO BORGHESE) was born on September 17th, 1552, and succeeded Leo XI. in 1605. He was engaged in a long struggle with the republic of

Venice, which sprang out of the claim of the clergy to freedom from civil jurisdiction. It was at last brought to a close through the interference of Henri IV. of France in 1607. He died on January 28th, 1621.

Paul, Tsar of Russia, was born on October 2nd, 1754. His father, Peter III., was murdered when he was in his ninth year. During the lifetime of his mother, Catherine II., he was not allowed to take any part in public affairs. He became emperor on her death in 1796, and soon excited the greatest discontent by his despotic and arbitrary measures. At first he took part with the Allies against France, despatching Suvaroff to the seat of war; but in 1799 he formed an alliance with Napoleon. He was killed, on March 23rd, 1801, whilst an attempt was being made to seize him by a band of Russian nobles, who intended to force him to abdicate. He married, first, Princess Augusta of Hesse-Darmstadt (1773), and secondly, Princess Dorothea Sophia of Württemberg (1776), who was received into the Greek Church as Maria Feodorovna and survived her husband for twenty-seven years. Paul was more or less mad, but his proposal that the European sovereigns should settle their differences by single combat had much to recommend it in the circumstances of his time. The annexation of Georgia in 1799 was the most important event in the internal history of his reign.

Paulding, JAMES KIRKE, man of letters, was born in Dutchess county, New York state, on August 22nd, 1779. His early bent towards literature was encouraged by his intimacy with Washington Irving, whom he assisted on the periodical called *Salmagundi*. The war of 1812 was responsible for his *Directing History of John Bull and Brother Jonathan* and an essay on *The United States and England* (1814). His novels, *The Dutchman's Fireside* (1831) and *Westward Ho!* (1832), and his *Life of Washington* (1835) were his most successful works, but his pen was prostituted in a defence of *Slavery in the United States* (1836). After four years' service as Secretary of the Navy (1837-41) he retired into private life, and died at Hyde Park, in the state of New York, on April 6th, 1860.

Pauli, REINHOLD, the German historian of England, was born in Berlin on May 25th, 1823, and was educated at Bonn. From 1847 to 1855 he resided in the United Kingdom, studying at Oxford and in Scotland, and acting during part of the time as private secretary to the Chevalier Bunsen. He was successively professor at Rostock (1857-9), Tübingen (1859-66), Marburg (1867-70), and Göttingen (1870-82). He died at Bremen on June 3rd, 1882. His works include a *Life of King Alfred* (1851), a continuation of Lappenberg's *History of England*, from Henry II. to the accession of Henry VIII. (1853-8), *Pictures of Old England* (1860), and a monograph on *Simon de Montfort* (1867). In 1874 he received the degree of D.C.L. from the University of Oxford.

Paulinus, first Archbishop of York, was sent from Rome by Gregory in 601 to assist Augustine in

Kent. On the marriage of Ethelburga, daughter of Ethelbert of Kent, to the pagan Edwin of Northumbria, in 625, he accompanied the princess to her new home, having been previously consecrated bishop by Justus, Archbishop of Canterbury. After some difficulty, he prevailed on Edwin to call a meeting of his wise men, in which the arguments for and against the Christian religion were fully discussed, the result being that the king and his court received baptism in a wooden chapel, on the site of which afterwards rose York Minster (627). For six years he laboured with zeal and success amongst the Northumbrians, but after the defeat and death of Edwin at Hatfield (633) he returned with Ethelburga to Kent, and was appointed Bishop of Rochester. It was while settled here that (634) he received the pallium which, in answer to a request from Edwin, Pope Honorius had sent to Paulinus constituting him metropolitan of the North. As he had now, however, ceased to occupy the see of York, the question has arisen whether or not he should be reckoned as an archbishop; but it is generally conceded that he must be accorded the rank. He died at Rochester on October 10th, 644.

Paulus, HEINRICH EBERHARD GOTTLÖB, theologian, was born at Leonberg, near Stuttgart, Germany, on September 1st, 1761, and was educated at Tübingen. After a period of travel in England and on the Continent, he settled at Jena as Professor first (1789) of Oriental Languages and afterwards (1793) of Theology. Leaving Jena in 1803 for his health's sake he held various posts in southern Germany till 1811, when he was made Professor of Exegesis and Church History at Heidelberg. This chair he filled till 1844, when he retired. He died on August 10th, 1851. His chief works were a Commentary on the New Testament (1800-4), a *Life of Jesus* (1828) and, particularly his Exegetical Handbook on the first three Gospels.

Paulus Diaconus, historian, was born in Lombardy about 720 or 725, and received the best education the times could supply. His retirement to the monastery of Monte Cassino about 774 seems to have been due to the overthrow of the Lombard kingdom by Charlemagne. He subsequently resided for some years in France, and was patronised by Charlemagne, but returned to his convent before his death, between 790 and 800. His chief work was his *History of the Lombards*, extending to the death of King Liutprand, in 744. Much of the material was taken from the histories of Secundus of Trent and Gregory of Tours.

Paul Veronese. [VERONESE.]

Paupropoda, an order of Myriapoda, including only the genus *Paupropus*—described by Lord Avebury—and *Eupaupropus*. They differ from their nearest allies, the Millipedes, in the small number of body segments and the few joints in the antennae. They live among damp decaying leaves, and are small in size.

Pausanias, Greek general, was the son of Cleombrotus of Sparta, whom he succeeded as regent and guardian of his cousin, the young king

Pleistarchus, son of Leonidas. He led the Spartan contingent sent to aid the Athenians against the Persian army under Mardonius, and commanded the allied forces which gained the brilliant victory of Plataea (479). The Persians having been driven from Greece, he sailed with a fleet to Cyprus, which he freed from the Persian yoke, and afterwards captured Byzantium (477). Elated by his constant success, he now began to offend the allies by his arrogance, and at the same time entered into a treasonable correspondence with Xerxes, the Persian king, hoping with his aid to secure the sovereignty of Greece. After being twice recalled from Byzantium by the ephors, or chief magistrates,

appear to be still in the nomad state, being scattered in small groups over the unsettled parts of south-eastern California and south-western Nevada, with small communities in Oregon and Utah. Their total numbers are estimated at 8,730.

Pavement, a flooring, or the artificial surface of an area, road, or path, made of stones, flagstones, bricks, tiles, concrete, or wood resting on a prepared bed. Hence a footpath of such formation on the side of a street or road. Pavements, or sidewalks, to employ the American designation, are frequently laid down in asphalt or granolithic concrete. The flagstones are obtained in great quanti-



THE CERTOSA MONASTERY, PAVIA.

[Photo: Brogi.]

and acquitted through lack of evidence, he was finally betrayed by a helot, to whom he had committed a letter for Artabazus, the Persian satrap. He fled for refuge to the temple of Athena, and the Spartans blocked up the door, leaving him to die of starvation about 467 B.C.

Pausanias, a Greek traveller and writer on topography, flourished in the 2nd century of our era under Hadrian, Antoninus Pius, and Marcus Aurelius. He is supposed to have been born in Lydia. His *Hellados Periegesis*, a sort of guide-book to Greece, with descriptions of temples, sculptures, etc., and local myths, though possibly in great part a compilation, is full of value, both for the antiquary and the anthropologist.

Pa-Utes, or PAI-UTES, North American Indians, a distinct branch of the Utes, who form a main division of the Shoshonean family. All

ties from quarries in Caithness and Forfarshire and the granite for cubes is derived from various parts of Scotland, Cornwall, Guernsey, and Norway.

Pavia, capital of the province of the same name, Lombardy, Italy, on the Ticino, two miles above its junction with the Po, and 20 miles S. of Milan. Having ceased to be a fortress in 1872, the ramparts have been converted into boulevards and gardens. The basilica of San Michele, restored in 1863-76, is a fine example of Lombardic architecture, dating probably from the 7th century. As it was within its walls that the kings of Italy, from whom the house of Savoy claims descent, were crowned, it was entitled in 1863, by royal decree, *Basilica Reale* (Royal Basilica). The Duomo of San Stefano, begun in 1488 and still unfinished, contains the tombs of St. Augustine and Boëtius. The palace of the Visconti, a quadrangle of immense size, begun in

1360, was much injured by the French in 1527, who at the beginning of the century had robbed the castle of its antiquarian treasures. The university, said to have been founded as a school by Charlemagne, was reconstituted in 1361. Attached to the university are the Borromeo and Ghislieri colleges, founded for poor students in the 16th century, a botanical garden, natural history museum (established in 1772 under Spallanzani) and the oldest anatomical collection in Italy. Other public buildings include the Municipal Palace (formerly Palazzo Mezzabarba), the Prefecture, and the fine arts museum. The industries include iron foundries, engineering works, electrical appliance works, cement factories and establishments for rearing silkworms; and there is a steady trade in wine, olives, silk, and Parmesan cheese. Pavia (called Ticinum up to the end of the 7th century) was founded by Gauls during the first Gallic immigration. It was the capital of the Lombard kingdom in the 7th and 8th centuries. In the struggles of the Guelphs and Ghibellines it usually sided with the latter, owing to jealousy of Milan, till in 1360 it passed to the Visconti family. Near this city Francis I. of France was defeated and taken prisoner in 1525, as to which he is said to have written to his mother, "All is lost save honour." The French regained it two years later. During the following three hundred years it changed masters repeatedly, Austrians, French, Spaniards and Austrians again occupying it. In 1796 Napoleon seized it; in 1848 the Austrians crushed the revolt, but in 1859 it passed, with the rest of Lombardy, to the Sardinian crown. The celebrated Carthusian monastery of Certosa (q.v.) lies 5 miles to the north of the town. Pop., 37,000.

Pawn, Pawnbrokers. Pawn signifies at the present day a pledge to a pawnbroker or person who takes goods by way of security for money advanced thereon, provided he trades under a licence. Statutory regulations have been made preventing frauds and overcharges by pawnbrokers. Thus every pawnbroker taking a pledge for a loan not exceeding £10 is bound to give the pawner a pawn-ticket, specifying the charges for interest, etc., which he is allowed by the statute to make, the period within which the pledge may be redeemed, and he is also bound to keep account books showing all sales of pledges made by him. He has a statutory power of sale by auction. If an unredeemed pledge is sold for a sum in excess of the amount of the original loan and the interest that has accrued, the balance must be paid to the borrower or be otherwise accounted for; it is not so much extra profit to the pawnbroker. By the Pawnbrokers Act, 1872, previous Acts were repealed and the statute law on the subject was consolidated. The sign of the three brass balls is said to be a modification of the armorial bearings (six red balls on a field of gold) of the illustrious family of Medici, the great Italian bankers of the Middle Ages. The traders from Lombardy who came to England in the 13th and succeeding centuries ultimately settled as bankers and money-lenders in the City of London, and Lombard Street, named

after them, became for a lengthy period the headquarters of the banking interest. On the Continent and especially in France the pawnshop is replaced by the Mont de Piété, in which the interest charged is somewhat lower and (so it is said) greater facilities exist for the recovery of stolen goods.

Pawnees, North American Indians, forming the chief division of the Caddoan family, though regarded by some as distinct from that connection. The original hunting-grounds of these renowned prairie Indians extended from the Niobrara river, Wyoming and Nebraska, to the Arkansas, though the boundaries fluctuated, and some of the tribes (Skidi) appear to have formerly dwelt east of the Mississippi. The four main divisions were the Grand Pawnee, Tappas, Republican Pawnee, and Skidi (Panimahn or Pawnee Loup), all of whom were removed in 1876 to the Pawnee and other reservations, Indian Territory (afterwards Oklahoma). Early in the 19th century they mustered as many as 10,000 fierce warriors, in constant feud with the Dakotans; but despite their warlike and even ferocious character, the Pawnees were the only North American aborigines who ever submitted to the state of slavery. Those captured by their enemies were constantly bartered as slaves, especially to the Franco-Canadian traders, and openly sold by them at the old station of Poskovic, on the Saskatchewan river. As their numbers are not estimated to exceed 660, the Pawnees would seem to be drifting rapidly towards total extinction.

Pawtucket, a city of Providence county, Rhode Island, United States, on the Pawtucket, 4½ miles N.N.E. of Providence. The river falls (50 feet deep) afford ample power for the different manufactures, which include cotton, calico, woollen and silk goods, leather, thread, twine, &c., machinery, electrical appliances, and paper, besides dye-works and bleachfields. The first cotton factory in the United States was erected here in 1790 by Samuel Slater. Pop. (1900), 39,231.

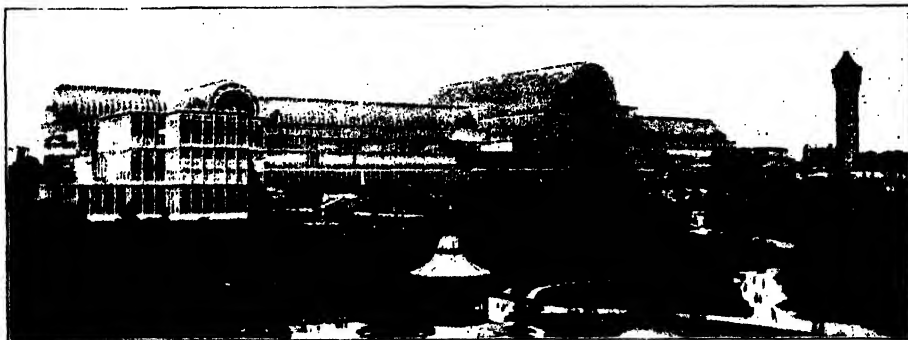
Paxton, SIR JOSEPH, gardener and architect, was born of humble parentage at Milton Bryant, near Woburn, Bedfordshire, on August 3rd, 1801. After serving an apprenticeship on different estates, in 1826 he entered the service of the Duke of Devonshire as gardener, and was eventually placed in charge of the gardens at Chatsworth, which he laid out with much skill on an entirely new plan. Ultimately the entire management of gardens, woods, greenhouses, conservatories, and arboretum was entrusted to him. Along with the Duke he made several tours both at home and abroad, and between 1839 and 1841 remodelled the village of Edensor, near Chatsworth. In 1849 he succeeded in flowering the Victoria Regia water-lily for the first time in Europe. His experience in the construction of buildings of glass and iron enabled him to gain the competition (for which he entered at the last moment) for the design for the buildings for the Great International Exhibition in Hyde Park in 1851, in which year he was knighted. In 1853 and 1854 he superintended the re-erection of

the Exhibition Buildings at Sydenham under the name of the Crystal Palace. In 1854 he became M.P. for Coventry, which he represented till his death at Sydenham on June 8th, 1865.

Pay, hill tribes in south-western China and northern Burma. They are of Shan stock, though in Burma largely assimilated to the Burmese. They consist of two branches—Diju on the left, Telson on the right bank of the Upper Irrawaddy. The type is described by Kreitner as much finer than that of the surrounding Mongolian populations—dark horizontal eyes, straight nose, and Caucasian expression.

Paymaster, an officer in the army and navy entrusted with the disbursement of moneys for the rank and file. In the British army there is a paymaster to every regiment of cavalry (excepting the

Payn, JAMES, novelist, was born at Cheltenham on February 28th, 1830, and educated at Eton (where he was not happy) and Trinity College, Cambridge. He had entered Woolwich Academy, but was not strong enough to pursue a military career. Attracted by literature he took to contributing to the periodicals of the day, and in 1859 was appointed sole editor (he had been made joint-editor with Leitch Ritchie the year before) of *Chambers's Journal*. Thenceforward he became a most prolific novelist, his best works being *Lost Sir Massingberd* (1864), *Married Beneath Him* (1865), *In Carlyon's Year* (1868), *By Proxy* (1878), *Thicker than Water* (1883), and *The Talk of the Town* (1885). In 1874 he resigned the editorial chair of *Chambers's* and became reader to Smith, Elder and Co., and from 1883 to 1896 editor of *The Cornhill*, and, at a later date, succeeded George



THE CRYSTAL PALACE, SYDENHAM. DESIGNED BY SIR JOSEPH FAXTON.

[Photo: York & Sons, Notting Hill, W.]

Life and Horse Guards) and infantry, whose business it is to receive drafts for the payments he has to make and for the sums required by the captains. His pay-lists are checked by the district paymaster and audited at the War Office. On active service the paymaster has the care and custody of the treasure-chests containing the cash. The duties of the naval paymaster (formerly called purser) are somewhat wider, since, besides attending to the payment of officers and men, he has charge of the provisions, clothing, and miscellaneous stores, and is responsible for their safe-keeping and issue. The duties of the similar officers in the United States services are practically identical.

Paymaster-General, an officer whose duty it is to make all payments of moneys voted by Parliament required by the several departments of the Government. The Lords of the Treasury place the necessary amount at his disposal, and the payments are authorised by the Comptroller and Auditor-General. He is assisted by an Assistant Paymaster-General and a staff of clerks. This office, which dates from the Restoration, and with which other offices were consolidated in 1835 and 1848, is held by a member of the Ministry who retires with the political party to which he belongs.

Augustus Sala, as purveyor of the column of weekly gossip, comment and anecdote, always a prominent feature of the *Illustrated London News*. Failing health compelled him to give up all editorial worry, and he died in London on March 25th, 1898.

Payne, JOHN HOWARD, actor and dramatist, was born at New York on June 9th, 1792. He made his *début* in his native city in 1809 in the character of "Norval," and afterwards toured in several of the States. Then he went to England, and appeared at Drury Lane in 1813, and, during the next twenty years, was actor, or playwright, or manager. Among his works were *Brutus*, with Edmund Kean in the title-part, and *Charles the Second*, which became a favourite with Charles Kemble. To a lyric in his opern of *Clari, or the Maid of Milan*, however, Payne owed not only fame but immortality, for this was none other than that pretty bit of sentiment, "Home, Sweet Home." In 1832 he returned to the United States, and was occupied in literary and dramatic work till 1841, when he was appointed consul at Tunis. Recalled in 1845, he was sent out again in 1851, and died at Tunis on April 10th, 1852.

Paysandu, capital of the department of the same name, Uruguay, South America, on the left

bank of the Uruguay, 220 miles N.W. of Montevideo. It carries on a large trade in cattle, and its chief industry is the preserving of ox tongues. Pop., 14,000.

Pea (*Pisum sativum*), the only distinct species of a genus of Leguminosæ. It is a hardy annual, probably wild in south-eastern Europe, but cultivated from a remote antiquity and now represented by numerous varieties. The whole plant is covered with a glaucous bloom. Though sometimes dwarf, it often climbs 8 or 10 feet by means of the clasping branched tendrils which terminate its scattered pinnate leaves. These leaves have each a pair of foliaceous stipules larger than their leaflets. The axillary flower-stalks bear one or two large white or pale-violet flowers of papilionaceous form, which are succeeded by pendulous, smooth, oblong, slightly-compressed pods with a hooked point. Each pod contains one row of several seeds which, when ripe, may be smooth or wrinkled, white, blue, or green. The cultivation of peas was introduced from Holland or France about the time of Henry VIII., but green peas were not much grown for the table till after the Restoration. Unripe or green peas contain more sugar and are more digestible, and split peas have the tough envelope of the seed removed. The varieties known as sugar-peas have fleshy pods which can be eaten like French beans. Peas are a most valuable flesh-forming food, containing as they do 22 per cent. of albuminoid matter, largely casein, to 51 per cent. of starch. Pea-flour is largely used in the form of pea-soup and pease-pudding. Pea-straw is a valuable fodder. The field-peas of farmers are sometimes distinguished as *P. arvense*. The sweet-pea of flower-gardens (*Lathyrus odoratus*) belongs to a closely-related genus, as do the various perennial everlasting-peas.

Peabody, GEORGE, philanthropist, was born at Danvers (now called Peabody after him), Massachusetts, on February 18th, 1795. After making a fortune in the dry goods trade at Baltimore, he became a banker in London (1837), and amassed immense wealth by his dealings in United States bonds during the Civil War. In 1862 he placed £350,000 in the hands of trustees for bettering the condition of the London poor, the sum being increased under his will to £500,000 and employed to erect model dwellings for artisans. He also gave £25,000 to his native town for educational purposes, and £100,000 to found an institute of science in Baltimore, besides many other generous donations to Harvard University and elsewhere. Queen Victoria offered him a baronetcy in recognition of his munificence, but he declined it, and in 1867 he received the thanks of Congress for his handsome support of public institutions in the United States. He died in London on November 14th, 1869.

Peace as an international term denotes the normal conditions which prevail among civilised nations, and which are for the most part secured by treaties; such treaties, however, being terminable when any party to them has the desire, accom-

panied by the power, to put an end to them. Thus Russia took an opportunity to declare her intention to disregard the provisions of the Treaty of Paris (1856) so far as they referred to her right to keep a fleet in the Black Sea. International peace can only be put an end to by a formal declaration of war. In 1899, at the instance of the Tsar of Russia, an international Peace Conference was held at The Hague. [NEUTRALITY.] The public peace is a term applied to the attitude of the members of a community to each other; and in most countries, as in England, a breach of the peace is a punishable act, and may be dealt with by justices of the peace, who are empowered to prevent an intended or expected breach of the peace by calling on the person suspected to provide security, or to enter into his own recognisances, to preserve the peace, under pain of imprisonment in default. This process, which is called the "exhibition of Articles of Peace," may be entered upon by justices either upon complaint or of their own motion. Religious Peace is a term applied to the convention which, after the Reformation, secured to the Protestant states of Germany the enjoyment of religious freedom. The Peace Society was formed in 1816 with the object of introducing the principle of arbitration as a substitute for war to settle disputes between nations. One of the five great prizes awarded annually by the Foundation established under the will of Alfred Bernhard Nobel (q.v.) is awarded for the best effort towards promoting fraternity between nations and furthering the cause of universal peace.

Peace, a river of Canada, rising by two headwaters in the Rocky Mountains about 55° N. and 125° W. As it leaves the Rockies it pursues a mainly north-easterly course to near Lake Athabasca where, reinforced by Stony River from that lake, it bends to the north and, under the name of Great Slave River, falls into Great Slave Lake near Fort Resolution. A considerable part of its total length of 1,050 miles is navigable, but Vermilion Falls, about 220 miles above the confluence of the Stony, and many rapids, effectually bar a through route by the stream.

Peace, CLERK OF THE, an officer whose duty it is to read indictments at the quarterly or other sessions of the peace, to enrol the Acts, draw the process, and perform various other duties connected with the administration of justice at the sessions.

Peach (*Amygdalus persica*), probably a native of China, where it has certainly been cultivated from the 5th century B.C., but introduced from Persia into Greece, in all likelihood by Alexander, a century later. It is commonly grafted on the plum or almond. The nectarine is merely a smooth-fruited variety, differing, however, in flavour. The stone or endocarp in both is coarsely furrowed, and the leaves are conduplicate in the bud. The flowers, which appear before the leaves, are of a delicate pink. The fruit in the peach has a separable woolly epicarp. Though deliciously flavoured and refreshing, since it contains 85 per cent. of water and 8 per cent. of pectose and gum, it does not contain

much nutriment. Peaches grow luxuriantly in the United States, where they are employed in distilling a brandy and as food for pigs, and whence they are largely exported both tinned and dried.

never been ascertained, save that it was reserved for persons that were nobly-born. The oath, whatever its origin, was of binding character. The peacock took its place in mythology as Juno's bird.



CHATSWORTH, IN THE PEAK DISTRICT OF DERBYSHIRE.

[Photo: R. Keene, Derby.]

Peacock, a bird belonging to the genus *Pavo*, Eastern Game Birds, with the bill of moderate length, the head crested, the wings rather short, the tail long, the upper coverts very long, and extending beyond the tail feathers. There are two species—*P. cristatus*, which has been domesticated for several centuries; and *P. muticus*, the Javan Peacock. Some authorities count a third (*P. nigripennis*), while others consider it a mere variety. The domestic peacock is a native of India, where it occurs in large flocks. Its splendid plumage has caused the bird to be reared as an ornament to gardens and parks; but it should be noted that the "peacock feathers" used by the male in his display and by man for decorative purposes are those of the upper tail-coverts, not of the tail. In these feathers the webs are separate for the greater part of the length, but united at the end, where there is an eye-like spot. The colours are chiefly greenish-blue and gold, brilliantly iridescent. The female bird is smaller and less gorgeously feathered than the male, and carries no train. These birds are now kept chiefly for display, though the flesh was formerly held in high esteem. In the Middle Ages knights had the strange custom of swearing by the peacock (and by the pheasant in countries where the peacock was seldom seen). How the oath arose has

Peacock, THOMAS LOVE, novelist and poet, was born at Weymouth on October 18th, 1785. Although his learning was mainly self-acquired, he became one of the best classical scholars of his time. As a young man he led a desultory life, publishing occasional volumes of verse of more or less merit. In 1812 he was introduced to Shelley, and the acquaintance ripened into close intimacy. Shelley's influence may be traced in Peacock's poem *Rhododaphne* (1818), which had been preceded by some novels that attained a great vogue—*Headlong Hall* (1816), *Melincourt* (1817), and *Nightmare Abbey* (1818). In 1819 he was appointed on the London staff of the East India Company and, three years later, published *Maid Marian*, which J. R. Planché shortly afterwards dramatised. He continued to relieve his official duties by literary pursuits, and the tale of *The Misfortunes of Elphin* appeared in 1829, followed, in 1831, by *Crotchet Castle*, perhaps the most brilliant of his novels. He died at Halliford, Middlesex, on January 23rd, 1866.

Peacock Butterfly (*Vanessa Io*), a widely distributed and one of the most beautiful of European butterflies. There is a large "eye"-like mark on each of the four wings, from which feature it derives its popular name. It occurs in England.

Peak, THE, a hilly tract in the north-west of Derbyshire, England. It is watered by the Derwent, Dove, Ashop, Noe, and Wye, and forms part of the Pennine range, of which Kinder Scout reaches a height of 1,981 feet. Yielding to the fondness of his countrymen for likening the scenery of his native land to that of foreign countries, John Ruskin called the Peak the "Switzerland of England." The comparison was unhappy, for, though the district is picturesque in the extreme and rich in historic interest, it yet lacks several of the characteristics of Swiss scenes. It contains the famous watering-places of Buxton and the two Matlocks; the Duke of Devonshire's palatial mansion of Chatsworth; the baronial pile of Haddon Hall, with its romantic associations of Sir George Vernon (d. 1567), the "King of the Peak" and father of Dorothy Vernon; and the village of Eyam where, in the visitation of the Plague in 1665-6, the heroic rector William Mompesson and his noble wife laboured to stay the ravages of the pest. Castleton, 12 miles N.W. of Bakewell, is sometimes called the capital of the Peak. It is celebrated for the castle, built in 1068 by William Peveril and immortalised in Sir Walter Scott's *Peveril of the Peak*, and several caves, in one of which rises the Noe and in another is obtained fluorspar, or Blue John, to give it its local name. Peak Forest, 5 miles N.E. of Buxton, was once a free chapelry in the king's forest at which, until 1804, when it ceased to be extra-episcopal and extra-parochial and its privileges were abolished, eloping couples used to be clandestinely married *à la mode de Grotto*. The yearly average of such marriages was eighty.

Pea-Nut. [GROUND-NUT.]

Pear (*Pyrus communis*), a tree belonging to the sub-order Pinnaceæ of the Rosaceæ, and to the same genus as the apple. It grows from 30 to 70 feet high, with a pyramidal outline; the branches are spinous in the wild state; the leaves are scattered, stalked, ovate, and somewhat leathery; the flowers are in clusters of five or nine, white, with a goat-like smell; the fruit is turbinate, with a fleshily-enlarged stalk, core near the apex and black seeds. Gritty particles, due to groups of wood-cells, occur in the flesh, especially of the wild form. The pear is native to Great Britain. Of the numerous cultivated sorts some are hard and tasteless when gathered, and must be kept several months; others are only suited for stewing or baking. Perry, or fermented liquor made from pears, is somewhat similar to cider. The flavour of the fruit is attributed to amyl acetate, an artificially-prepared alcoholic solution of which is used in confectionery under the name of essence of jargonelle pears.

Pearl (Latin, *pirula*, "a pear; a jewel"), generally, as the name implies, pear-shaped, a mass of nacre, formed within the body or shell of certain molluscs—e.g., the Pearl-oyster and the Unio, or freshwater mussel. The pearl-oyster, however, it may be remarked, is not an oyster. The received theory of the origin of pearls is that they are caused by the presence of a foreign body within the shell

or body of the animal, such body in the course of nature being covered by an extra secretion of shell-forming substance, in much the same way that a bullet or other foreign body becomes encysted within the human frame. This fact is taken advantage of to produce artificial pearls by the introduction of particles of sand or the like into the shell of the pearl-bearing oyster. In the East and especially in China tiny figures of Buddha are thus inserted and covered with the secretion, which hardens in due course into a beautiful iridescent nacreous deposit. The pearl-oyster is chiefly found in the Persian Gulf, Japan, the Bay of Bengal, Ceylon, and other parts of the Indian Ocean. South American waters also have produced fine pearls. The ancients were well acquainted with the pearls of Ceylon and the Persian Gulf. The pearl-fisheries, which start in spring, employ many boats, the crews of which generally number twenty, ten of whom row, while the rest are divided into shifts of five, who relieve each other in the work of diving for the oysters. The pearls, which differ according to the locality and food of the oyster, are polished with nacre-powder and passed through sieves which separate them by size into mill-, vivadoe-, and seed-pearls. Those most prized are found in the soft parts and are called virgin pearls. The nacre lining the shell, or mother-of-pearl, is also valuable, and is split from the shell and classed as silver-lipped, bastard-white, and bastard-black. The yield of the Ceylon fisheries—which are now under Government control—varies,



PEARS (*Pyrus communis*).

In some seasons, occasionally successive, it falls off very decidedly, either from over-fishing, or from the migration of the oyster, for this animal has the power of separating from its beard and taking up a new position; but in time the beds often

recover their fertility. Among notable pearls may be mentioned one possessed by Julius Caesar worth £48,000, one by Cleopatra (£80,000), one by a Shah of Persia (£180,000), and a South American pearl of 250 carats (£150,000). Off the coasts of West Australia and Queensland pearls of considerable value are fished for and, in the United States, the fisheries of Lower California, with headquarters at La Paz, yield fine black pearls. The pearl-mussel is found in most shallow rivers of Central and Western Europe. British pearls, once highly esteemed, are derived from the freshwater mussels in the Spey, Tay, Dee, Don, Ythan, Forth and other Scottish streams.

Pearly Nautilus, the popular name for the true Nautilus, used to distinguish it from the Paper Nautilus (*Argonauta*).

Pearson, JOHN, bishop, was born on February 28th, 1612-13, at Great Snoring, Norfolk, of which place his father was rector. In later life he expressed his gratitude that he was "bred in a family in which God was worshipped daily." From Eton he passed to Queens' College, Cambridge, and in 1632 was elected scholar of King's, taking holy orders in 1639. Eager in the pursuit of learning he denied himself sleep and spent his money on books. He was appointed in 1640 chaplain to Lord Keeper Finch, by whom he was presented with the rectory of Thorington. Before the opening of the Westminster Assembly in 1643 he preached on *The Excellency of Forms of Prayer*, and boldly declared his views, afterwards joining the Royalists, in 1645, as chaplain to the forces in Exeter. He was deprived of his rectory, but a small patrimony enabled him to maintain himself and two younger brothers. He apparently lived in London in retirement until the Restoration, devoting himself to further study. In 1654 he was made preacher, without stipend, at St. Clement's, Eastcheap, and while there preached in substance the sermons which were published in 1659 as *An Exposition of the Creed*, which has been considered the most perfect and most complete production of English dogmatic theology. Next in importance, besides a long list of minor works, is his *Vindicie Epistolarum S. Ignatii*, an answer to Daillé's attack on the authenticity of the letters of St. Ignatius which Bishop Lightfoot regarded "as light to darkness." After the Restoration he was presented by Bishop Juxon, of London, to the rectory of St. Christopher's, in the City. In 1662 he was elected Master of Trinity College, Cambridge, and, Royalist though he was, resisted an attempt by the Crown to encroach on the rights of the Master and Fellows. Appointed Bishop of Chester in 1672, Pearson died on July 16th, 1686, a man of spotless life, whose courtesy won the respect of his opponents. Baxter said, "If all were in his power it would have gone well."

Peary, ROBERT EDWIN, Arctic explorer, was born at Cresson Springs, Pennsylvania, United States, on May 6th, 1856. Educated at Bowdoin College, Brunswick, he entered the United States navy in 1881, serving as Assistant-Engineer in the

Government Survey of the Nicaragua Ship Canal in 1885, of which he afterwards became for a time Sub-chief Engineer. Accompanied by Eivind Astrup, Peary, in 1892, started on his first expedition to North Greenland. Journeying across Greenland they succeeded in discovering the northern limit of the inland ice-cap. In 1895 he made a second expedition, which, however, did not add much to the information already gained. During the summers of 1896 and 1897 he again voyaged in the Arctic regions. In 1898 and 1900 he started expeditions to discover the North Pole. He rounded Northern Greenland and reached 84° 17' N., but was forced to return to his base. Sailing from New York on July 12th, 1905, he again started for the North Pole in a specially constructed vessel, *The Roosevelt*, which was designed to force its way through the ice, and furnished with instruments for wireless telegraphy. He fully achieved his purpose, for in 1906 he made, by way of Grant Land, 87° 6' N., which is farthest north ever reached by any explorer. Beyond the scientific value of a successful journey he said his ambition was "to win the one great prize never to be re-won, never to be surpassed. It is man's physical conquest of the world." Peary, who holds the rank of Commander in the United States navy, was married to Josephine C. Diebitsch in 1888, and is author of *Northward over the Great Ice* and various geographical papers.

Peasant Proprietorship, a system whereby the small holder, in consideration of security of tenure, cultivates his land. Until the 18th century the bulk of the land in the United Kingdom was technically waste, and the yeomen exercised the rights of common, some acquiring their holding by purchase, and others frequently by setting up a house on the common and annexing as much ground as they desired or their neighbours might permit, to the detriment of the peasantry. It became evident that, if after a long period of depression husbandry should recover, the enclosure of the common fields was both necessary and wise. The great agriculturist Arthur Young (1741-1820) stirred up an unimaginative race of farmers to try new methods, and succeeded in arousing a widespread interest in scientific agriculture. Between 1709 and 1869 a great many Acts directed to the enclosure of wastes and commons were passed. But the peasantry suffered. The labourers and the small farmers being deprived without compensation of the privilege of grazing, the industrious labourer lost his hope of bettering his condition and the small farmer was threatened with extinction. Before the close of the 18th century the hardship inflicted on the rural population attracted the attention of statesmen and philanthropists. Wilberforce took an active part in advocating the principle of allotments. Experiments were made which led to the passing of an Act in 1819 empowering churchwardens and overseers of parishes to acquire land, not exceeding 25 acres, and to let it to any poor and industrious parishioner. In 1831 this was amended. The quantity of land was extended to 50 acres, and power was given to enclose waste or common land, not exceeding 50 acres, for the

same purpose. Legislation was continued and inquiries were instituted as to the working of the various Acts. From 1710 to 1867, 7,660,413 statute acres were added to the cultivated area of England and Wales, but it was found that land offered privately was more readily let than through official sources. Notwithstanding, causes for dissatisfaction remained. The rural exodus continued, and an agitation, led by Joseph Arch and others, gave force to the amendment (afterwards known as the "Three-acres-and-a-cow" amendment), proposed by Mr. Jesse Collings, which caused the defeat of Lord Salisbury's Government in 1886. In 1887 an Allotments Bill was passed which proved disappointing. In 1890 a Committee reported in favour of Mr. Jesse Collings's proposals, and in 1892 Mr. Henry Chaplin's Small Holdings Act was passed. Its purpose was to enable the labourer to acquire land of not less than one acre or more than 50 acres in extent. As the first attempt towards the creation of a peasant proprietary this measure deserved greater success than it has achieved. The small proprietor has the strongest motive for industry. In France and in Denmark, where the whole family work on the farm and dairy, his operations prosper. Whether this is due to closer application or to greater thrift may be a matter for discussion, though it seems tolerably evident that both factors are likely to have free play under the system of *petite culture*. From the annual reports of the Board of Agriculture it appears that the cultivated land of Great Britain is mainly occupied by farms of 50 to 300 acres, which are holdings of greater size than the vast majority of peasants in the United Kingdom could work. A Committee was appointed in May, 1905, to inquire into the working of the Act of 1892, and as to any means by which its working could be made more advantageous. Opinions differ widely as to the value of small holdings; but proportionately they are more productive than large farms, and are specially adapted to encourage home production as against the competition of foreign growers. The system calls for resourcefulness and rewards the labourer according to the industry he puts into it. "A small proprietor," says Adam Smith, "who knows every part of his little territory, who views it with all the affection which property, especially small property, naturally inspires, takes pleasure not only in cultivating it, but in adorning it, and is generally of all improvers the most successful."

Peasants' War. Smarting under the oppression of the feudal system and the burden of taxes which they alone paid, the farmers and peasants of Germany rose in rebellion early in the 16th century. Fired by the example of former small risings, notwithstanding the failure of the recent nobles' war against the princes, they were filled with new hopes of freedom which the Reformation inspired. Luther, while reproving acts of violence, had urged their masters to deal justly with their people. In vain they looked to the cities for help. The wealthy burghers despised them, and the Church failed, as ever, to come to their relief. Minor insurrections in 1522 and 1523 were suppressed,

but when in January, 1525, the Abbey of Kempton was plundered, it proved the signal for a general rising in South Germany. At first the princes and nobles thought the rebellion was directed against the ecclesiastics, whose authority they were willing should be restricted. They were soon undeceived. The towns were threatened into submission, and even some of the nobles, to save their property, were forced to join the insurrectionary movement. A number of Swabian nobles with their families having taken refuge in Weinsberg, the rebellious peasants, on Easter-day, 1525, led by Florian Geyer, a captain of mercenaries, appeared before the town, carrying as their standard a pole with a shoe on the top, a screaming, black-draped hag running before, inciting them to revenge. The terrified citizens fled into the church for safety, while Count Louis of Helfenstein and the soldiers retired within the castle. The garrison's offer to surrender was scornfully rejected. They were butchered by the victorious peasants, who forced their victims to run between a lane of swords and pitchforks, the Count being called upon to "open the dance" before the eyes of his unhappy wife. The Archduke Ferdinand promptly raised an army commanded by the pitiless Von Waldburg to deal with the rebellion, which had now assumed serious proportions. The peasants appointed Goetz von Berlichingen, a notorious robber-knight, as their leader. Their success led to great excesses. Castles and convents were destroyed. Pillage and murder became rampant, and Luther wrote calling on the princes "to strangle and stab them [the misguided folk] as one would kill a mad dog." At length the peasants sustained a series of defeats, and in turn suffered a terrible revenge. During the war no fewer than 150,000 lives are supposed to have been sacrificed, and the lot of those who survived, both nobles and peasants, became harder than before, the authority of the princes being more securely established than ever.

Peat, vegetable matter, more or less altered, accumulated to a depth sometimes reaching 50 feet in regions in temperate climates where there is insufficient drainage. It may be compact, but is generally fibrous and brown or black, and contains about 60 per cent. of carbon. The bogs in which it is formed are known as peat-mosses. They occupy one-seventh of the surface of Ireland and large areas in other countries, often covering the sites of lakes which they have choked, and entombing the stems of oak, yew, pine and other woods, and the bodies of pre-historic mammals, preserved by its antiseptic power. It is mainly made up of the bog-moss or Sphagnum in most districts; but in the English fens, of rushes and sedges. It forms at a rate of from half an inch to two and a half inches per annum, and is largely dug under the name of turf for fuel in Ireland and elsewhere. Hams are sometimes cured in peat reek or smoke, and the flavour of peat water is thought by some to improve whisky—but tastes differ. Whisky distilled over a peat fire and flavoured with peat smoke was popularly called "peat reek," and the product of such illicit stills was known by that pleasingly poetic and

alluring name of "mountain dew." When swollen by heavy rain, peat-mosses sometimes burst the layer of matted vegetation that covers them, especially if on an elevated ledge, and inundate the neighbourhood with black mud. Such a disaster has occurred at times in Kildare and other parts of Ireland covered by the vast Bog of Allen. Flanders Moss, to the south of the Forth in Stirlingshire, was once a rich alluvial plain, but, owing to the ruthless destruction of forests by the Roman invaders (about 210), was converted into its present condition of bog land. By natural drainage, long continued, some mosses gradually acquire a certain amount of cohesion. Thus the Lochar Moss, in Dumfriesshire, in Robert the Bruce's time impassable to bodies of troops, now bears railways and public roads, and one of George Stephenson's engineering triumphs was the crossing of Chat Moss in Lancashire with a railway. Airds Moss in Ayrshire was the scene of the fight between the Covenanters and the royal dragons, in which Richard Cameron fell (July 22nd, 1680).

Peaucellier Cell is a seven-bar linkage invented in 1864 by a French officer, after whom it is named. The accompanying figure (Fig. 1) shows it in its simplest position. Four equal bars $A P$, $A Q$, $Q B$, $B P$ are jointed to form a rhombus, the joints

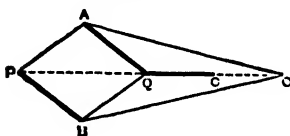


FIG. 1.

allowing it to be freely closed or opened. OA and OB are equal bars fixed at O , while CQ , the seventh bar, is half the length OQ , and is fixed at C . Q therefore is constrained to describe a circle whose radius is CQ , while A and B move in circles round O . If $A'Q'B'P'$ (Fig. 2) be any new position of the rhombus or "cell," it is easy to show that the product $OQ' \times OP'$ is equal to $OA'^2 = OQ'^2$; but OQ' and OP' are fixed lengths; hence the product $OQ' \times OP'$ is constant for all positions of the linkage, and is therefore equal to $OQ \times OP$. From this it follows that $P'P$ is perpendicular to OP . Hence while Q describes a circle,

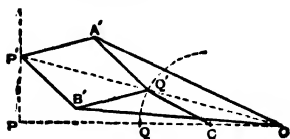


FIG. 2.

P moves in a straight line. P and Q are called the "poles" of the cell. The fixed point C may be anywhere on the line OP , and the point P will describe a circle, the radius of which depends upon the position of C ; when, however, OQ is bisected at C , as in the case described, the radius becomes infinite, and so P describes a straight line.

Peba (*Tatusia novemcincta*), a species of armadillo which ranges from Texas to Paraguay. It is about thirty inches long, of which the tail counts for nearly half. There may be seven or nine bands in the carapace; there is a pair of teats in the groin as well as on the breast, and from four to ten young are produced at a birth.

Pecary, a genus of small wild swine from the New World. Of the two species *Dicotyles torquatus* ranges from Arkansas to Patagonia, while *D. labiatus* is confined to the country between

PECCARY (*Dicotyles torquatus*).

British Honduras and Paraguay. The former is harmless, but the latter species is very fierce and roams about in large herds. On occasions the lives of travellers have been jeopardised by the suddenness of the onset of a band of these animals.

Peck, a measure of capacity used for dry goods. It is equal to the fourth part of a bushel, or two gallons. The imperial peck holds 554.548 cubic inches, while that of the United States contains 537.6 cubic inches. The old Scots peck was the fourth part of a firiot, or the sixteenth part of a boll, and contained 553.5625 cubic inches when used for wheat, but 807.55 for barley, pulse, salt and other articles.

Pecock, REGINALD, theologian and controversialist, was probably a Welshman and born about 1395. He was educated at Oxford and was elected fellow of Oriel College in 1417. In 1431 (having become a priest in 1421) he was made master of Whittington College in London, and in 1444 was appointed Bishop of St. Asaph, whence he was translated to Chichester in 1450. His *Repressor of Over Much Blaming of the Clergy* (1455, though begun six years before) was a forcible defence in the fine English of the period of the doctrines and ritual of the Church against the attacks of the Lollards. His views on the relation of natural and revealed religion and other points bear a striking resemblance to those of Hooker. In his *Book of Faith* (1456) his position frequently approaches that of the Lollards themselves; thus he disputes the infallibility of the Church and accepts probability as a ground of faith. In consequence of an attack on his writings made in a council at Westminster in 1457, he was cited before Archbishop Thomas Bourchier, and at a final examination was offered the choice of public recantation or the stake. He abjured his errors at St. Paul's Cross and handed over his works to be burnt. The intervention of the Pope, to whom he appealed, failed to avert the loss of his see, and his closing years were spent in retirement at Thorney Abbey, in Cambridgeshire, where probably he died in 1460.

Pecten, the type-genus of the Scallops or family Pectinidæ. They are bivalve Mollusca, generally with ribbed shells, but always provided with a pair of "ears" to each valve of the shell. They first occur in the Trias, after which they are abundant as fossils. The genus has often been quoted from Palæozoic rocks, but these belong to other genera, such as *Aviculopecten*, *Pernopecten*, etc. Those Scallops with smooth shells are often separated as the genus *Entolium*.

Pectinated Rhombs are certain rhombic areas on the plates of the Palæozoic class of Echinoderms known as *Cystidæ*; these areas are crossed by a number of grooves pierced by pores. Their function is uncertain; they may be respiratory, reproductive, or both.

Peculiar People, a religious sect founded in London in 1838, and also known by the name of **FAITH-HEALERS**. The distinguishing feature of their creed is a literal acceptance of the apostolic injunction (James v. 14, 15), in case of disease, to call for the elders of the Church to pray over the patient and anoint him or her with oil in the name of the Lord. Though the sect is sincere and clean-living, their peculiar tenets have occasionally brought them into collision with the law of the land, and some of their number have at times been imprisoned for neglecting to summon qualified medical aid in illnesses that have terminated fatally. The sect is not very numerous and is chiefly recruited from the ranks of Labour.

Pedata, an order of Sea-cucumbers or Holothurians including those with well-developed tube feet (pedicels or pedia) which are the most typical forms. It is sub-divided into two sub-orders: the *Dendrochirota*, in which the tentacles are arborescent, and the *Aspidochirota*, in which the tentacles are simple and peltate. The former is represented by the common British *Psolus*, and the latter by the type-genus *Holothuria* or cotton-spinner.

Pedia, or **PEDICELS**, are the "tube feet" of Sea-urchins, Starfish, and Brittle-stars; they are locomotive organs and assist in respiration. It is important to distinguish them from the pedicellariæ, which occur in the same animals but are different both in function and structure.

Pedicellariæ are spines found in various classes of the Echinoderms, and so modified as to form prehensile organs. The typical forms occur in the Sea-urchins; these consist of a small flexible stalk, at the free end of which are the three pointed valves; these are hinged and can be closed round any foreign body with which they come in contact. Their grip is often so firm that the head of the pedicellariæ is usually torn from the stalk before the valves are relaxed. In some cases, as in the Heart-urchin (*Spatangus*), the pedicellariæ are enclosed in a hollow in the plates of the external skeleton or test. In others there are four valves; while in some forms, known as "globuliferi," the valves are atrophied and only the gland and stalk remain. In the Starfish the pedicellariæ are

usually sessile—i.e., have no stalk—the valves are rarely more than two in number and are pointed instead of hooked. In the common English Brittle-stars, pedicellariæ are quite absent, but in some tropical species belonging to the Euryalida there are some simple forms which are probably rudimentary. The function of the pedicellariæ is very doubtful, and probably differs in the different classes; they are unquestionably prehensile organisms and help in locomotion, seizing food, removing excreta, or may also be organs of touch and smell.

Pediculus. Three species of lice are met with in the human subject—the *Pediculus capitis* or head-louse, the *Pediculus corporis* or body-louse, and the *Pediculus pubis*. The first-named variety sometimes infests the heads of children, causing much irritation. The female louse deposits the ova or nits upon the hairs, where they are seen as minute semi-transparent bodies. The body-louse deposits its ova on the clothes, and its presence brings about a papular eruption on the skin. The condition in which the body is infested by lice is called phthiriasis. Treatment consists in the abundant use of soap and water, with employment of such applications as mercurial ointments or a preparation of staphisagria seeds.

Pedigree, a table exhibiting the genealogy of a person, family, or animal; hence, a line of ancestors; lineage or descent. The word is supposed to be a transliteration of the Old French *pie de grue*, from the "three-line mark (like the broad arrow) used," says Professor W. W. Skent, "in denoting succession in pedigrees," a mark that had a fancied resemblance to the claws of a bird. In the 15th century, it must be borne in mind, the crane was a common bird in England and France. The name Pettigrew still preserves the ancient form. Blood or strain has always been a point of final importance both in the case of families and animals. The pedigree of cattle, dogs and horses affects the value immeasurably, while the claims of long descent, whether from the Conqueror or the "grand old gardener and his wife," are among the foibles of human nature. In the Baroness Nairne's song of "The Laird o' Cockpen," the "lang pedigree" at least compensates for the lass's pennilessness. The College of Arms in London and the Lyon Office in Edinburgh are the final authorities in matters of genealogy.

Pediment, a term employed in architecture to designate the triangular part, resembling a low-pitched gable, surmounting the façade of a building



in the Grecian style, and particularly found over the portico. The surface is a flat plane or

tympanum within a recess framed by a cornice, and preferably adorned with sculptures, as was the case in the pediment of the Parthenon, many of the sculptured figures of which (by Pheidias) are now in the British Museum, and that of the Temple of Zeus at Olympia. In later styles, such as the Roman and Renaissance, the word was applied to similarly-placed members of the scheme without reference to their form, that is, to semi-circular, elliptical, or other shapes equally with triangular.

Pedipalpi, an order of air-breathing Arachnida closely allied to the Scorpions, which used to be included in it. The members of this order differ from the Scorpions in that the head and thorax are fused into a mass and separated from the abdomen by a definite constriction. They thus in some ways resemble the Spiders. They further differ from the Scorpions by having no sting on the end of the abdomen. They differ from the Spiders by the presence of a jointed abdomen and the absence of the web-spinning organ or spinnerets. The two principal genera are Thelyphonus, which has the pedipalpi or "foot-palps" chelate or pincer-like; and Phrynus, in which they are only clawed. Both are land-dwellers and live in tropical regions.

Pedlars. [HAWKERS.]

Pedometer, in its simplest form, is an instrument used for measuring the number of paces taken by a pedestrian. It is generally of the shape and size of a watch, and is carried in the pocket, a movable lever or pendulum moving at each pace taken and recording the same by means of a needle which traverses a certain marked space on the dial. Modifications of this instrument attached to a wheel will register the number of revolutions made, and a similar contrivance is used to register the revolutions of the screw or paddle-wheels of steam vessels.

Pedro the Cruel, King of Castile and Leon, the son of Alfonso XI., was born at Burgos, Spain, on August 30th, 1333, and succeeded his father in 1350. By the aid of Albuquerque, who had been Chancellor and Prime Minister during the previous reign, he was able to consolidate his power and even, at the proper moment, to dispense with that statesman who had over-reached himself and made many enemies. Pedro received his surname in consequence of the murder of his brother, Don Fadrique (1358), who had joined the fallen minister and another brother, Don Enrique, in stirring up a revolution. Enrique fled to France, but returned in 1365 with an army composed of free companies, led by Bertrand du Guesclin and Calverley. Pedro then secured the aid of Edward the Black Prince, by whose forces Enrique was defeated in the battle of Najera or Navarrete (April, 1367); but he failed to fulfil his promises to the prince and alienated him by his haughty conduct. Edward, therefore, returned to France, and on March 13th, 1369, Pedro was vanquished by Enrique at Montiel. A few days later he was inveigled into visiting his brother in his tent, and there a quarrel broke out, in which Pedro was slain.

Pedro I., EMPEROR OF BRAZIL, was born on October 12th, 1798. He was the son of John VI. of Portugal, whom he accompanied to South America when he fled thither during Napoleon's invasion (1807). On his father's return (1821) he remained behind as regent, and in the following year was declared emperor, Brazil becoming an independent state. On his father's death (1826) he was expected to succeed him on the Portuguese throne, but Dom Pedro gave up his European kingdom to his daughter Donna Maria, preferring to cast in his lot with the newly-formed Empire. It was an unhappy choice, for the constant anarchy which prevailed culminated in a revolution (1831), and Dom Pedro abdicated in favour of his son, and sailed to Europe. Here he found his brother Dom Miguel had seized the throne, but in 1834 he regained the ascendancy and the usurper retired into exile. Dom Pedro died in Lisbon on September 24th, 1834, only a few days after his daughter's majority had been proclaimed.

Pedro II., DE ALCANTARA, was born at Rio Janeiro on December 2nd, 1825, and was declared Emperor of Brazil in 1831. During his minority a spirit of discontent had gradually grown up with which the regency was unable to cope. After the king's coronation, however, things slowly improved and then ferment died down. The king intervened in the affairs of Paraguay and Uruguay, and the consequent fighting distracted attention from internal troubles. With the growth of republican sentiment since 1870, however, the abolition of slavery (1888), and the enormous increase of white population due to immigration, the antiquated method of government was condemned by public opinion, and the king was forced to abdicate in 1889. Soon afterwards he sailed for Lisbon, and died in Paris on December 5th, 1891. He was a man of considerable scientific attainments.

Peduncle (from the Low Latin *pedunculus*, "a little foot"), the axis, or foot-stalk, as it is sometimes called, bearing an inflorescence. Its branches, if any, are called secondary peduncles, or, if they are the ultimate ones bearing the flowers, pedicels. The tulip has an unbranched peduncle; in the fig it becomes fleshily enlarged and, by peripheral growth, concave, bearing the flowers within its cavity. In many plants it bears leaves below the flowers, known as bracts, or, when collected together, as the involucre, and in the *Cupuliferæ* it gives off a cup-shaped outgrowth which contributes to the formation of the cupule.

Peduncle, the stalk by which various animals are attached, as in the Barnacles or Brachiopoda. [LAMP SHELLS.]

Peebles, the county town of Peeblesshire, Scotland, 22 miles S. of Edinburgh. It is beautifully situated on the left bank of the Tweed, which is here joined by Eddleston Water, and is a favourite inland health resort. The principal buildings are the large hydropathic, picturesquely placed on a wooded height, the town hall, the county hall, and Chambers Institution. This last was once a mansion of the Hays of Yester, and afterwards of the

Queensberry family. It was acquired in 1857 by Dr. William Chambers, the well-known publisher, a native of the town, by whom it was adapted to the purposes of a library, museum and art gallery. In its quadrangle stands the old town cross. The Cross Keys hotel and a former landlady are said to have been the prototypes of the Cleikum Inn and Meg Dods of Sir Walter Scott's *St. Roman's Well*. The town is of great antiquity, its name derived from *pebylla*, the "texts" of the Gadeni, the pre-Roman inhabitants. As the centre of a hunting district it was the frequent resort of the Scots kings, and James I. celebrated it in his poem of *Pebblis to the Play*. According to the famous anecdote it has never lost its character for joyousness. "Payris, a' things considered," was the Peeblesian's estimate of his trip in France, "is nae doot a very fine place, but gie me Peebles for pleasure." The most venerable ruins are those of the churches of the Holy Cross and St. Andrew. The tower of the latter was restored by Dr. William Chambers, who rests beneath its shadow. The only considerable industry is the manufacture of woollen goods. Pop. (1901), 5,266.

Peeblesshire, or **TWEEDDALE**, a county in the south of Scotland, bounded on the N. and N.E. by Edinburghshire, on the E. and S.E. by Selkirkshire, on the S. by Dumfriesshire, and on the W. by Lanarkshire. The maximum length from N. to S. is 29 miles, the breadth 21 miles, and the area 356 square miles. The central part of the county is occupied by the valley of the Tweed (which gives the shire its alternative title), on each side of which is an upland track, consisting for the most part of what Dr. John Brown called "solemn whale-backed hills," such as Broad Law and Cramalt Craig, both over 2,700 feet high, intersected by rich valleys and deep gorges. Nearly all the streams are feeders of the Tweed, among them, on the right, the Talla, Polmood, Drummelzier, Manor and Quair; and, on the left, the Biggar, Stobo, Lyne, Eddleston, and Leithen. The Medwin in the north-west flows into the Clyde, and the North Esk and South Esk, both rising in the county, form, during part of their course, the boundary with Midlothian. Sheep-farming is vigorously pursued, and the chief crops are oats and potatoes. Coal, limestone, and iron ore occur, but scarcely pay for the working. The woollen manufactures at Innerleithen, Walkerburn and Peebles (the county town) are the staple industry. Pop. (1901), 15,066.

Peel, a small tower or fortified dwelling. In its crudest form it was a structure of earth and timber, strengthened by palisades. With the improvement of weapons of war, this gave place to a substantial square tower, built of stone, the walls being pierced with narrow apertures. It consisted of several storeys, all reached from the inside, and the angles were sometimes turreted as in the tower of Gilnockie, Dumfriesshire, the home of Johnnie Armstrong, the famous freebooter. The ground floor was usually vaulted and reserved for the stolen cattle. Access to the living-rooms was had by means of a movable ladder to the door on the first

floor. Peels are yet fairly numerous on the Borders of England and Scotland, where they were mostly erected in the 16th century by mosstroopers and cattle-lifters. They thus served the double purpose of dwelling-houses and places of defence or retreat.

Peel, a seaport of the Isle of Man, 10 miles N.W. of Douglas. It is famous for the ruins of the fine castle which was built on Patrick's Isle, and which is accessible by causeway and ferry. The stronghold was erected in the 12th century, but was mainly rebuilt by Henry, Earl of Derby, in the latter part of the 16th century. It includes the roofless ruin of the venerable cathedral of St. German, the crypt of which was once used as a prison. The chief industry is the sea-fishery, but net-making and some ship-building are carried on. Peel is in growing repute as a midsummer resort. Pop. (1901), 3,306.

Peel, **SIR ROBERT**, statesman, born near Bury, in Lancashire, on February 5th, 1788, was the son of Sir Robert Peel, the first baronet, a wealthy cotton manufacturer. He was educated at Harrow and Christ Church, Oxford. In 1809 he was elected Tory member



SIR ROBERT PEEL.

(By Sir Thomas Lawrence, P.R.A.)

for Cashel, and in 1811 was made Under-Secretary for the Colonies. As Chief Secretary for Ireland (1812-18) he aroused so much ill-feeling by his ultra-Protestant policy that he was at length compelled to resign. Meanwhile (1817) he had exchanged his former seat for that of Oxford University. In 1819 he was chosen Chairman of the Bank Committee,

and in this capacity effected a return to cash payments. His tenure of the office of Home Secretary under Lord Liverpool (1822-7) was marked by many useful measures. Being unable to agree with Canning, who succeeded Lord Liverpool as Premier, on the question of Catholic Emancipation, he resigned; but in 1828 he joined the Duke of Wellington in forming a new Cabinet, in which he again took charge of the Home Department. At the same time he became leader of the House of Commons, and found himself forced to move the Catholic Relief Bill (March, 1829), the very measure which had occasioned his withdrawal so short a time before. This change of policy led to his defeat at Oxford (but he was almost immediately elected for Westbury, and afterwards, in August, 1830, for Tamworth), and ultimately to the overthrow of the Government (November, 1830). For the next ten years Peel was leader of the Opposition, with the exception of an interval in 1833-4, during which he led a Conservative Ministry, which speedily found itself too weak to combat the Whigs. His attitude in regard to the Reform policy of the Melbourne Administration was marked throughout by moderation, good sense, and great practical ability. He was hailed with enthusiasm as leader of the Tory party on its return to power in 1841, but such measures as the Maynooth grant and the establishment of the "godless" colleges in Ireland (1845), no less than the Premier's financial policy, which was evidently in the direction of Free Trade, caused a rift in the Conservative party which resulted ultimately in its collapse. The climax came with the proposal to repeal the Corn Laws, which Peel—already a Free-trader at heart—felt to be forced on him by the Irish famine and the bad harvest in England in 1845. Deserted by an important section of his followers, he retired to make way for Lord John Russell; but the latter failed to form a ministry, so that it actually fell to Peel to carry through the House the Bill for the complete abolition of all duties on corn (June 25th, 1846). On the same night, however, he was defeated on an Irish Coercion Bill through a combination of Whigs and dissatisfied Tories, and retired from office. During the rest of his life he gave an independent support to the Whigs as far as their home government was concerned, though he opposed their foreign policy. He would accept no honours and refused the Garter. As he was riding up Constitution Hill towards Hyde Park his horse threw him, and he died of the injuries then received on July 2nd, 1850. Disraeli (afterwards Earl of Beaconsfield), who had spared no effort to hound him down, described Peel as "the greatest Member of Parliament that ever lived."

Peele, GEORGE, dramatist, is supposed to have belonged to a Devonian family, and to have been born probably in London about 1558. He was the son of James Peele, clerk of Christ's Hospital, London, where he was educated. He was a student of Christ Church, Oxford, from 1574 to 1579, taking his master's degree in the latter year. Already a noted poet at the university, he now proceeded to London, and in 1584 published *The Arraignment of*

Paris—a pastoral comedy, interspersed with songs—which was written for representation before the queen. Its highest merits are ready wit, ingenious fancy, and elegant versification—qualities which may also be claimed for *Edward I.* (1593), *The Old Wives' Tale* (1595), and *David and Bethsabe* (1599), although a tendency to bombast is always apparent. In London and Oxford Peele led a wild, dissipated life, and seems to have been often reduced to extreme poverty. The date and place of his death are unknown, but it has been conjectured that his end, hastened by vicious habits, was reached in 1597 or 1598.

Peep o' Day Boys, the title assumed by the Ulster Protestants who formed themselves into an association for the maintenance of their rights and privileges between 1784 and 1795, and who were (to a considerable extent) the forerunners of the Nationalist or Home Rule party of a century later. They adopted the name in playful allusion to their custom of visiting the houses of their Roman Catholic adversaries (who were called the Defenders) at peep of day in search of arms or plunder. They latterly lapsed into the faction of Orangemen.

Peepul, or **PIPAL**, the sacred fig (*Ficus religiosa*) of India and bo-tree of Ceylon. The Hindus revere it because Vishnu is said to have been born under it, and the Buddhists hold it as holy because Gautama (Sakyamuni) is believed to have become "enlightened" (the Buddha) after sitting beneath its branches during forty days of concentrated thought. For these reasons the tree is planted near temples, and devotees constantly resort to its shelter for reflection. It reaches a great size and age, and presents a certain resemblance to the banian, though the branches do not root as in the latter tree.

Peerage. [NOBILITY.]

Peewit. [LAPWING.]

Pegasus, the winged horse of mythology, was the offspring of Poseidon and Medusa, springing from the latter's body when her head was cut off by Perseus. Bellerophon rode upon it to his encounter with Chimæra, and then attempted to fly to heaven, but was thrown by Pegasus, which was stung by a gadfly sent by Jupiter to punish the insolent presumption of its rider. With a stroke of its hoof Pegasus gave rise to the spring Hippocrene on Mount Helicon. It is said to have been fixed in the heavens as a constellation.

Pegu, capital of the district of Pegu, Lower Burma, on the Pegu, 46 miles N.E. of Rangoon. It is a place of considerable antiquity, and in the 16th century is said to have had a population of 150,000 persons. One relic of its former magnificence remains in the eight-sided pagoda or temple of Buddha. Alompra utterly destroyed the town in the 18th century, but it was rebuilt. In the first Burmese war it was surrendered to the British, but was more stoutly defended in the second war, although ultimately captured (1852). The inhabitants are mostly traders. Pop., 10,762. The Division

OF PEGU, of which Rangoon is the capital, has an area of 13,083 square miles and a pop. of 1,820,000; the DISTRICT OF PEGU contains 4,276 square miles and a pop. of 340,000.

Fehlevi, a form of the Persian language formerly current in western Iran, intermediate between the Old Persian of the Behistun inscriptions and Modern Persian, but overcharged with Semitic elements. It is the language of the coins of the Sassanian dynasty, of several inscriptions of the early Sassanian kings, and of the oldest extant comments on the Avesta, and died out towards the middle of the 7th century. There is a grammar by Spiegel, who proposes Huzvareh as the proper name of this mixed Perso-Semitic language. The alphabet, of which there are several forms, is derived from the Aramaic or Old Syriac (Es-tranghelo), which is itself derived from the Phœnician.

Paine Forte et Dure—"strong and merciless punishment"—was a method of torture inflicted upon those who refused to plead when indicted for felony. In cases of high treason, or petty larceny, such a refusal was treated as equivalent to a confession of guilt. The practice existed in the time of Edward I., and was finally abolished by 12 George III., and refusal to plead now amounts to a plea of "Not Guilty." The victim—who might, however, plead benefit of clergy—was taken back to prison, laid on his back, subjected to a gradually-increasing weight of stone or iron, and fed on alternate days with mouldy bread and a draught taken from the standing water nearest the prison, the process continuing till he pleaded or died. His object in resisting was, of course, to escape the injury his conviction would have entailed on his family by confiscation of his property, etc.

Pekan. [MARTEN.]

Peking ("Northern Capital"), the capital of China, in the province of Chili, on a sandy plain between the Peiho and its tributary the Hunho, 100 miles N.W. of the mouth of the Peiho in the Gulf of Pe-chili and 35 miles S. of the Great Wall. It is situated in 39° 54' 36" N. and 116° 27' E. at the head of the Grand Canal. It comprises the Inner or Manchu City, which is square in form, and the oblong Outer or Chinese City, which adjoins the former on its southern side, extending somewhat farther towards the east and west, but considerably narrower from north to south. Both cities are surrounded by walls, those of the Inner City being about 50 feet high, and from 40 feet to 60 feet thick. Their total length, excluding the cross wall, is 21 miles, and they embrace an area of nearly 26 square miles. There are sixteen forts, each of which is surmounted by a lofty tower built in galleries with numerous loopholes. The Manchu City is divided into three quarters, the outermost portion, which covers the larger part of the area, enclosing the quadrangular Imperial City, within which, again, is the Purple Forbidden City, also oblong in form, with a circuit of somewhat over two miles. To this innermost city foreigners are not admitted. Besides

the palaces of the Emperor, his kinsfolk, and various high officials, it contains several spacious and magnificent public halls, such as the Hall of Grand Harmony, in which the Emperor holds his levees. The Imperial City is surrounded by a wall of 20 feet, the western portion consisting of the Western Park. To the north of the Purple Forbidden City, on the other side of a moat, is the wooded artificial mound called Prospect Hill, 150 feet in height. In the outside quarter of the Inner city, to the north of the Imperial City, are the Drum and Bell Towers. The Outer or Chinese City contains but few buildings, the greater part of the surface consisting of wooded or cultivated ground, with numerous artificial lakes and tanks. Here is the famous Altar to Heaven, the most celebrated of the many religious spots in Peking. Unlike most Chinese towns, Peking has spacious streets, the width of the more important thoroughfares exceeding 100 feet in the Outer City, while in the Inner City it is even more. These streets are lined with brick buildings of one storey, the shops being decorated with gilding and paint. Elsewhere in Peking, however, the houses are wretched hovels. There is now a Roman Catholic cathedral, and an imperial university with European professors was established in 1868. The climate is very trying, varying from 10° F. in winter to 105° in summer. The printing and bookselling trade is very important, and there are manufactures of idols, coloured glass and other articles. Electrical works were introduced in 1900, and the city is connected by railway with Mukden, Tientsin and other towns in the south. Peking is a city of great antiquity, its history dating back to the 12th century B.C., when it was the capital of the province of Yen. In the Boxer disturbances of 1900, its safety was threatened, and for some time the foreign residents were besieged. They were eventually relieved by the Allied Forces (of the United Kingdom, Russia, France, Germany, and Japan), and the Empress and Emperor and the Court fled from the city, not returning until 1902. Pop. estimated not to exceed 1,000,000.

Pelagius, the founder of the heresy which bears his name, was a native either of Britain or Brittany—more probably the former—and was born in the latter half of the 4th century, his name being a Hellenised form of the Cymric Morgan ("sea-born"). Though a monk, he never took holy orders. He lived for many years in Rome, but crossed over to Carthage with his devoted follower Coelestius, after the sack of the city by Alaric in 410. Coelestius having attempted to obtain orders, his views were called in question and condemned in a Carthaginian synod. When these tidings were carried to Jerusalem, where Pelagius then was, a charge of heresy was brought against him by Orosius, who was supported by Jerome. Those efforts to discredit his teaching were at first unsuccessful, but Popes Innocent I. and Zosimus declared against him, and he and his followers were finally condemned in a council at Carthage attended by 214 bishops (418). He was soon afterwards banished from Rome, and in 431 both he and Coelestius were again condemned by the

Council of Ephesus. The date and place of the death of Pelagius are not known. The substance of his heresy was a denial of original sin.

Pelargomorphæ, in Huxley's classification, a group of birds containing the storks and their allies.

Pelargonium, a large genus of Geraniaceæ, mostly natives of South Africa, varying in habit, some being succulent undershrubs. Many of them are cultivated in gardens, under the name of Geraniums, for their showy flowers, which differ from the true Geranium in being monosymmetric, having a spur to the posterior sepal adherent to the pedicel, the petals sometimes differing in shape and colouring, and from three to six of the ten stamens are abortive. The leaves are stipulate, palmately-veined, and entire or lobed; the flowers are in a simple umbel with an involucre; and the styles, which adhere to a columnar carpophore in the beak-like fruit, twist spirally when it is ripe. The name means stork's-bill. *P. capitatum* is cultivated round the Mediterranean for the essential oil of geranium used to adulterate attar of roses; but the oil is now chiefly obtained from the *Andropogon Schoenanthus*, a grass that grows in central and northern India.

Pelasgians, the oldest known inhabitants of Greece, who are supposed to take their name from Pelasgus, youngest son of Niobe, and who are traditionally represented as a wandering people who left traces of their presence in every part of Hellas (*Plasgiotis*, a district of Thessaly; the *Pelagium* or oldest parts of the Acropolis of Athens, built by them, etc.). Regarding their origin and ethnical relations to the Greeks proper, much diversity of opinion prevails; but although Herodotus distinguishes between them and the true Hellenes, and speaks of Pelasgian dialects still surviving in his time at Creston, in Thrace, and at Placia, in the Hellespont (I. 57), Dionysius is probably right in regarding the Pelasgians as essentially Greeks (*to tîn Pelasgôn genos Hellenikôn*). It may, in fact, be inferred from Thucydides (I., introduction) that they represent the first waves of Hellenic migration into Greece and the islands, where they continued to lead wandering lives as pirates and rovers on the sea and marauders of the mainland before forming settled communities. According to this view, which seems most in accord with the national traditions, the Pelasgian dialects mentioned by Herodotus would represent an archaic form of Greek before it became differentiated into the later Æolic, Doric, and Ionic dialects.

Pelasgic Architecture, the earliest type of masonry found in Greece. It consists of masonry constructed of unhewn stones without cement.

Pelecypoda, a term meaning "axe-footed," now often used as a substitute for Lamellibranchiata, the bivalve shell-fish. The foot in this class is usually triangular and somewhat axe-like.

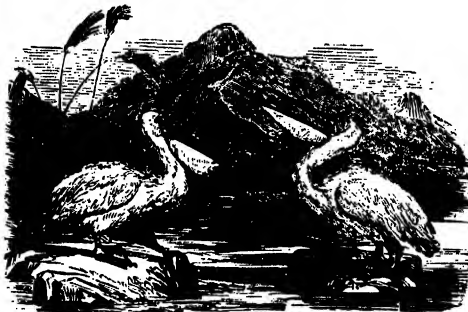
Pelew Islands, a group in the Pacific, situated to the west of the Carolines in 70° N. and

135° E. They are 26 in number, Babelthup being the largest, are mostly coral, many uninhabited, and they have an area of 180 square miles. They are wooded, fertile, and have a good climate. Coconut, sugarcane, bread-fruit, areca-nuts and yams are cultivated, and turtles, trepang (sea-cucumber), and fish abound. Tortoise-shell and mother-of-pearl are made by the natives. The islands were discovered in 1543 by the Spaniards, by whom they were sold to Germany on October 1st, 1899. Pop., mostly Malay, 3,101.

Pelham, THE FAMILY OF, has produced several distinguished English statesmen. THOMAS PELHAM-HOLLES, Duke of Newcastle, the son of Thomas, first Lord Pelham, and Lady Grace Holles, daughter of Gilbert Holles, third Earl of Clare, was born on July 21st, 1693, and educated at Westminster School and Clare College, Cambridge. He attached himself to the Whigs, and in 1715 was created Duke of Newcastle. After acting as Secretary of State under Walpole from 1724 to 1738, he began to intrigue against him, encouraging the king's wish for war, and procuring Walpole's downfall in 1742. From 1743 to 1754 he was Secretary of State in the ministry of his brother Henry Pelham, whom he succeeded as First Lord of the Treasury. In 1756 his unpopularity compelled him to resign, but he returned to office in the following year as nominal head of a ministry, the real leader of which was Pitt. In 1762 he retired to make way for the Earl of Bute. He was afterwards Lord Privy Seal in the short Rockingham Administration of 1765. He died in London on November 17th, 1768. Newcastle possessed no political gifts of a high order; his long tenure of power was wholly due to his wonderful tact and adroitness in intrigue. His brother, HENRY PELHAM, was born probably in 1695, and educated at Westminster School and Hertford College, Oxford. He became Secretary of State at War in 1724, and Paymaster of the Forces in 1730. After Wilmington's death in 1743 he became head of a ministry as First Lord of the Treasury and Chancellor of the Exchequer, and except for a short interval in 1744, remained in power till his death. His ministry, which at first included Carteret (Earl Granville) and afterwards Pitt and Chesterfield, earned the name of the "Broad Bottom Administration." The War of the Austrian Succession was brought to a close by the Treaty of Aix-la-Chapelle in 1748. Of other measures of the ministry the most important were those connected with the Jacobite rising (1745), Pelham's successful financial Bill lowering the interest of the national debt to three per cent. (1749), the reform of the calendar, and Lord Hardwicke's Marriage Act (1753). Pelham was a skilful financier, and his policy was highly advantageous to British trade. He died in London on March 6th, 1754. HENRY PELHAM FIENNES PELHAM CLINTON, fifth Duke of Newcastle, was born in London on May 22nd, 1811, and educated at Eton and Christ Church, Oxford. He entered Parliament in 1832, and attached himself to the party of Sir Robert Peel. He was Secretary of State at War during the early part of the Crimean War (1854), and endeavoured to secure an efficient

management of the department, but resigned in consequence of the feeling excited against him by the hardships endured by the troops in the terrible winter of 1855. He was subsequently Colonial Secretary (1859-64), and died at Clumber Hall, Nottinghamshire, on October 18th, 1864.

Pelican, a bird belonging to the genus *Pelecanus*, constituting the family *Pelecanidae*, with several species, from tropical and temperate regions. Pelicans are large fish-eating water-birds, frequenting rivers, lakes, and coasts, and rarely seen far from land. They have, a long, large, flattened bill; the upper mandible is strongly hooked, and beneath the lower is a large dilatable pouch of naked skin, serving as a receptacle for prey, which is stored therein, either to feed their young, or to be devoured at leisure. The best-known species, the Common Pelican (*P. onocrotalus*), is a native of



PELICANS (*Pelecanus onocrotalus*).

south-eastern Europe, Asia, and North Africa. It is about the size of a swan, but looks larger, from the fact that the plumage is very loose. The general hue is white, with a flesh tint, and in old birds the feathers on the breast become a golden yellow. The nest, with two or three white eggs, is usually on the ground, not far from water. The story that the mother-bird feeds her young with blood from her own breast, is, of course, fabulous; but as flamingoes discharge a bloody secretion into the mouths of their young, and even into the mouths of other birds, it has been suggested that this habit, transferred from one bird to another, and improved in the process, is the foundation of the myth. A small colony of pelicans has been introduced into St. James's Park, London, where their appearance on the ornamental water excites the keenest interest. They have taken kindly to their quarters.

Pelican-Fish, a deep-sea, eel-like fish, with large head and exceedingly wide gape, described in 1882 by Vaillant. In the following year *Gastrotomus Bairdii*, of somewhat similar structure, was discovered by Gill and Ryder. These are probably allied to the genus *Saccopharynx*, deep-sea eels, remarkable for swallowing fish larger than themselves.

Pelion, in classical geography, was a lofty mountain-ridge of Thessaly, extending along the

sea-coast throughout the whole length of Magnesia from Mount Ossa in the north to the promontories of Sepias and Æantium in the south. It is still covered with vast forests, as it was in the days of Homer. The ancient myth told how the Titans piled Ossa on Pelion in their endeavour to scale Olympus.

Pélissier, AIMABLE JEAN JACQUES, marshal, was born at Maromme, department of Seine-Inférieure, France, on November 6th, 1794. He began life as a private soldier and from 1839 to 1855 was engaged in active service in Algeria, becoming General of Division in 1850; he callously suffocated 500 Arabs in a cave (1845). In May, 1855, he succeeded Canrobert as commander-in-chief of the French forces in the Crimea, and on the fall of Sebastopol was appointed Marshal of France (September 12th, 1855) and created Duc de Malakoff on July 22nd, 1856. In 1858 he was ambassador at the Court of St. James's, and on the outbreak of war with Italy (1859) was commander of the army of observation at Nancy. In the same year he became Grand Chancellor of the Legion of Honour, and in 1860 was appointed Governor-General of Algeria, a post he held till his death on May 22nd, 1864.

Pellagra, a disease met with in Italy and the south of Europe, one of the characteristic symptoms of which is a skin eruption of an erythematous type, accompanied by much itching, and leading to the deposit of cutaneous pigment. It is almost always due to meagre diet, over-work, and insanitary conditions. The staple food of the peasantry is poor, home-grown maize that makes an innutritious and unsavoury porridge, enough of itself to breed disease. Under a wholesome diet and improved surroundings the progress of the disease will be checked, and if these conditions are prolonged cure may be looked for. Otherwise the malady will go on until the nervous system is ruined and the miserable victims succumb to wasting, dropsy, diarrhoea, idiocy, and typhoid.

Fellow, EDWARD, VISCOUNT EXMOUTH, admiral, was born at Dover, England, on April 19th, 1757, and, the family having removed to Penzance, was educated at Truro Grammar School. He entered the navy in 1770, was present in the action on Lake Champlain (1776), and was taken prisoner with General Burgoyne at Saratoga (1777) in the American War of Independence. In 1780 he was promoted captain, from 1786 to 1789 was on the Newfoundland station and, in 1793, was knighted for his gallantry in the fight in the English Channel with the frigate *Cléopâtre*. In 1796, for his bravery in saving the lives of the men on the transport *Dutton*, which had gone ashore in a storm off Plymouth, he was made baronet. He was afterwards often engaged with the French in the Bay of Biscay until the Peace of Amiens (1802), when he became M.P. for Barnstaple. Hostilities having been renewed, however, he was appointed commander-in-chief in the East Indies with the rank of rear-admiral (1804), succeeded to the command in the Mediterranean in 1811 and in 1814 was

raised to the peerage as Baron Exmouth, and became Admiral of the Blue in the same year. The Dey of Algiers having refused to abolish Christian slavery a fleet under Exmouth bombarded the town and brought him to reason (1816), Exmouth being created viscount for his services. He was commander-in-chief at Plymouth from 1817 to 1821, was appointed Vice-admiral of the United Kingdom in 1832, and died at Teignmouth on January 23rd, 1833.

Pellico, SILVIO, patriot and dramatist, was born at Saluzzo, in Piedmont, Italy, on June 24th, 1788. During his residence at Milan (1810-20) he composed *Francesca da Rimini*, *Eufemia da Messina*, and other tragedies. He sympathised with Italian aspirations for freedom from the Austrian yoke, and his contributions to the short-lived *Conciliatore* led to his arrest in 1820. While in jail he wrote the tragedies of *Ester d'Engaddi* and *Iginia d'Adri*. Condemned to death in 1822, the sentence was commuted to fifteen years' imprisonment, and he was placed in the Spielberg at Brünn. He was released in 1830, and two years later published *Le Mie Prigioni*, an account of his life in prison, which soon became popular throughout Europe, owing to the genuine tone of the narrative and the simplicity and grace of the style. Though his literary activity was not wholly suspended, he spent many of his later years in co-operating in the charitable work of the Marchesa di Barolo, the reformer of the Turin prisons, and died in Turin on January 31st, 1854.

Pelmatozoa, the stalked members of the phylum Echinodermata—viz., the Sea-lilies—and the two extinct classes, the Cystoids and Blastoids. It is doubtful whether the classification will stand, as it is probable that many of the Sea-lilies or Crinoids, as well as some Blastoids, were stalkless. The common Rosy Feather Star of the English coasts (*Antedon bifida*, Linn.) is free in the adult form, but this is due to the loss of the stalk, which is present in the embryo; but it is possible that some Crinoids, such as the remarkable genus *Marsupites* found in the Chalk, were absolutely stalkless.

Pelopidas, a Theban general and patriot, of noble birth, whose name is inseparably linked with that of his life-long friend and associate Epaminondas. After the occupation of the Theban citadel by the Spartans (382 B.C.), Pelopidas, as a member of the democratic party, was forced to withdraw to Athens. In 379 he returned with his fellow-exiles, and expelled the Spartan garrison from Thebes. He was then elected one of the three Boeotarchs, or chief magistrates of Boeotia, and continued throughout the remainder of his life to hold high offices of state. As leader of the Sacred Band, a chosen troop trained by himself, he played a conspicuous part in many brilliant victories over the Spartans, especially at Tegyra—when the repulse of the Spartans by an inferior force greatly impressed Greece—and in the brilliant battle at Leuctra (371). In 367 he undertook a successful embassy to the Persian court, and effected a treaty (which proved abortive) with Artaxerxes for the purpose of

securing the leadership of Thebes among the states of Greece. Pelopidas was slain at the battle of Cynoscephalæ, in 364, in which his troops were victorious over the Thessalian tyrant, Alexander of Pheræ.

Peloponnesus, the ancient name of the Morea, the peninsula which forms the southern part of Greece. Its area is about 9,000 square miles. It is attached to the northern half of the kingdom only by the Isthmus of Corinth, about four miles wide. From north-west to south-east it measures about 160 miles, and is nearly 100 miles wide. The leading Peloponnesian states were Sparta, Corinth, and Argos.

Pelops, a hero of Greek mythology, the son of Tantalus and grandson of Zeus. The myth relates that Tantalus slew his son, and served him up at a banquet to the gods; but the only portion eaten was part of a shoulder which Demeter took in absence of mind. The gods then restored Pelops to life by placing the limbs in a boiling cauldron, the place of the lost shoulder being supplied by one of ivory. Pelops afterwards went to Pisa in Elis to woo Hippodamia, daughter of King Onomaus, who would only give her to the man who should overcome him in a chariot-race. By the help of Poseidon Pelops gained the victory and won his wife. He grew so mighty that the peninsula of Greece was named after him Peloponnesus (Isle of Pelops).

Peltier Effect. Lubeck discovered in 1822 that an electric current might be produced by heating or cooling the junction of two dissimilar metals in a closed circuit, and so it was to be expected that when a current is sent from a battery, or some other source, across such a junction this point would be heated or cooled. The actual phenomenon was discovered by Jean Charles Athanase Peltier (1785-1845), the physician and meteorologist, in 1834. If, for instance, a current be sent along a wire one-half of which is of antimony and the other half of bismuth, the junction of these two metals will be heated if the current flow from the antimony to the bismuth; but the junction will be cooled if the current be reversed. This heating or cooling is known as the Peltier effect, and is proportional to the strength of the current causing it. It is to be distinguished from the heat developed in a circuit on account of its resistance, which is proportional to the square of the current and is not reversible, while the Peltier effect is reversible.

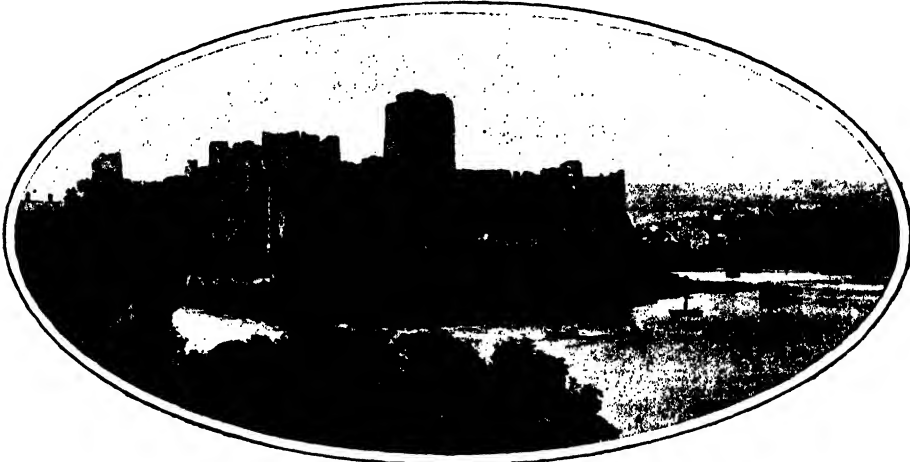
Peltry, the undressed skins of animals whose fur is commercially valuable. The term was in constant use in the palmy days of the Hudson Bay Company, when the Indian trappers brought in their pelts, or fur skins, to the different factories. The red men in the United States drove innumerable one-sided bargains with the wideawake dealers in New York and on the Atlantic seaboard. The French *pellotier* means 'skinner' or 'furrier.'

Pelvis. This term, derived from a Latin word signifying "a basin," is applied to that portion of

the human skeleton which intervenes between the lumbar vertebræ and the thigh-bones. The pelvis is made up by the sacrum and coccyx posteriorly, while on each side are what are termed the innominate bones. Each innominate bone consists of three parts—the ilium above, the ischium below and behind, and the pubes anteriorly. The two pubic portions of the innominate bones are united in front, forming what is known as the symphysis pubis. The two iliac portions of the innominate bones articulate with the lateral aspects of the sacrum, forming the sacro-iliac joints. The three portions of the os innominatum are fused in the adult, but are distinct bony masses in early life; they meet together at the acetabulum, the cup-like cavity with

which was erected towards the close of the 11th century. There is a fine keep—a five-storeyed, circular tower, 75 feet in height, and the walls are 14 feet thick. Beneath the ruins is the underground cave called the Wogan. Oliver Cromwell's six weeks' siege of the castle in 1648 did serious damage to the structure. The Government dockyard (1814), covering 80 acres, and strongly fortified, is situated at Pater or Pembroke Dock, 2 miles N.W. Pop. (1901), 15,853.

Pembrokeshire, a maritime county occupying the south-western corner of Wales, bounded on the N.E. by Cardiganshire, on the E. by Carmarthenshire and on all other sides by the sea. It has an



PEMBROKE CASTLE, FROM THE RIVER.

which the head of the femur articulates. Just below and in front of this cavity there is a large opening in the os innominatum, which is called the obturator foramen. The pelvis is divided into two parts—the true and the false pelvis; these are separated from one another by a plane which is called the brim of the true pelvis. This brim is mapped out by the promontory of the sacrum behind, and by two ridges which extend on each side from the sacral promontory to the anterior portion of the pubes, and are known as the ilio-pectineal lines. [KIDNEY.]

Pemba, an island off the east coast of Africa, situated on 5° S., about 50 miles N.E. of Zanzibar. It is included in the Zanzibar Protectorate of which the Sultan is still titular sovereign, but is under British administration. It has an area of 380 square miles, produces cloves and timber, and has a pop. estimated at 50,000.

Pembroke, seaport and county town, Pembrokeshire, Wales, 6 miles S.E. of Milford, on a navigable creek of Milford Haven. It is famous for its castle, the birthplace of Henry VII., in 1456.

area of 611 square miles. The coast-line exceeds 140 miles in length and is for the most part rugged and deeply-indented, the chief inlets being Milford Haven, St. Bride's Bay, Newport Bay, and Fishguard Bay. The surface consists of ranges of green hills—rising in Cwm Cerwyn of the Presceley range to a height of 1,754 feet—separated by fertile valleys. The chief streams are the Teifi, separating the county from Cardiganshire; the East Cleddau and West Cleddau, which unite in Milford Haven; the Nevern and the Gwayne. The quality of the soil varies greatly in different localities. Coal (anthracite), slate, iron and lead are worked. Oats, barley, potatoes and turnips are the leading crops and, besides mining, the principal industries comprise ship-building, the making of flannel, rope, and sails, and the fisheries. Many of the people in the neighbourhood of Haverfordwest are descended from a colony of Flemings which settled here in the reign of Henry I. The name of "Little England beyond Wales" has been given to the county, owing to the exceptionally large proportion of English-speaking inhabitants. Of the numerous castles, more or less ruinous, the most interesting are those

of Pembroke, Manorbier, Carew, Newport, and Haverfordwest. The shore is rich in archaeological remains. In the caves near Tenby remains of prehistoric man and bones of *Bos longifrons* have been found. On the Roman road, Via Julia, extended to the coast at St. David's and on Caldy Island, 2½ miles south of Tenby, Ogham inscriptions have been discovered. St. David's is the site of an ancient cathedral; Fishguard was the scene of the so-called French invasion in 1797, while it and Milford are the ports for the short route to the south of Ireland, and Tenby is a popular watering-place. Pop. (1901), 88,749.

Pemmican, a preparation of dried meat, used in North America, and resembling the *tasajo* of South America and the *biltong* of South Africa. The pemmican of the trappers in Canada is prepared by drying strips of lean meat in the sun and wind. This meat is then pounded and put into bags (fruits and berries being occasionally added), and then melted fat is poured into the bags. The preparation of pemmican for Arctic expeditions, in which it is found very useful, differs in some particulars from the above process.

Pemphigus, a skin disease attended with formation of bullæ or blebs, varying in size from that of a pea to that of a walnut, containing serous fluid. It is most common in underfed weakly children. The blebs cause much irritation, and when they break leave an open sore, which must be protected from the air. The treatment consists in improved food, healthy surroundings and tonics. The variety known as pemphigus foliaceus affects the entire body and almost always exudes a discharge. This form calls for serious attention, since its effects are so exhausting as to lead to chronic weakness, prostration and death.

Pen, an instrument for writing with fluid, has been known from remote antiquity. The first pens were perhaps of the nature of brushes for painting words or word-signs, but the reed-pen seems to have been early introduced, and a natural development seems to have been the employment of feathers from the wings of birds, which were so eminently fitted for this use, and which, in spite of later inventions, have never been surpassed. Quills are known to have been used in the 5th century of our era, and from that time the quills of geese, swans, turkeys, crows, ptarmigan, and other birds have been largely employed, and have given their name to the whole class of writing implements, the word "pen" in fact being the Latin *penna*, "feather." In 1803 a steel-barrel pen was introduced and sold at half-a-crown. In 1830 and at later dates the names of Perry, Gillott, Mason, Mordan and Mitchell came into prominence, and ever since the manufacture and improvement of steel pens has been steady. The great home of the pen manufacture is Birmingham. Gold is also employed for pens, the points being tipped for hardness' sake with an alloy of iridium. To avoid the trouble of carrying about a supply of ink separate from the pen, various kinds of fountain-pens, with an automatic ink supply, have been invented. The

stylograph substitutes a movable needle for the ordinary pen, pressure on the needle enabling the ink to flow through a small orifice and mark the surface to be written upon. Edison invented an electric pen, consisting of a small perforating appliance, operated by an electro-magnetic motor in connection with a battery and used after the manner of a lead pencil. As it moves over the paper it punches a series of holes, thus making a stencil that can be used to reproduce the letters formed by the action of the pen.

Penal Servitude, a species of punishment in British criminal law which took the place, in 1853, of transportation beyond the seas, then abolished. It consists in imprisonment with hard labour in any penal establishment in the British Empire for a number of years, varying according to the gravity of the crime or other circumstances of which the judge may reasonably take note.

Penance, a punishment for fault or sin, self-inflicted or voluntarily submitted to. Most religions of the world have encouraged the idea that voluntary suffering expiates some of the effects of sin, among such religions being notably the Jewish, the Hindu, and the Christian. In the early Christian Church penance might be private, as a sequel to confession; public, in which the punishment, if not the confession, was in the presence of the congregation; and solemn, in which case the penitent was barred, for a longer or shorter time, from greater or lesser church privileges. Solemn penance lasted in the Eastern Church till the 4th century, and in the Western till the 7th, its place being then taken by pilgrimages and the like. In the Roman Church penance is a sacrament, and consists of three parts—contrition, confession, and satisfaction, which are followed by absolution. Some Protestant bodies have endeavoured to reintroduce the ancient practice of public penance. In Scotland, for instance, especially in the 18th century, a cutty or low stool (the stool of repentance) was reserved in church for offenders against chastity and other delinquents, who had to sit under the public gaze during time of service and afterwards submit to open rebuke from the pulpit.

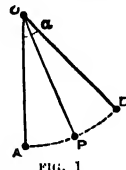
Penang, more fully PULO-PENANG ("Island of betel-nut palm"), also called PRINCE OF WALES ISLAND, the most northerly of the Straits Settlements, is situated off the west coast of the Malay Peninsula, at the northern extremity of the Strait of Malacca, 360 miles N.W. of Singapore. It is separated from the mainland by a channel which varies in width from two to ten miles. The island is fifteen miles long with an average breadth of eight miles, and an area of 107 square miles. It has belonged to Great Britain since 1785 and, together with Province Wellesley, which was annexed in 1798, and the Dindings (both on the mainland), forms part of the Crown colony known as the Straits Settlements. The surface is rugged and mountainous, rising to the height of 2,920 feet above the sea-level; but along the coast there is a low alluvial tract, the soil of which is very fertile. The whole island is well wooded, and rice, maize, sugar and

spices are largely cultivated. The temperature generally varies from 70° to 95° F. The capital, George Town, is a fortified place at the north-eastern extremity of the island. About one-half of the population are Chinese. Most of the commerce of the Malay Peninsula passes through Penang. Province Wellesley averages eight miles in width and extends 45 miles along the coast, including 10 miles to the south of Krian, the total area amounting to 270 square miles. The small island of Pangkor off the coast of Perak was, along with a strip of the opposite mainland, acquired by Great Britain, the whole being styled the Dindings. Pop. of Penang, including Province Wellesley and the Dindings (1901). 248,207.

Penates, among the ancient Romans, the guardian deities of the household. The family hearth was their altar, and their images, two in number, were placed on it or else kept in the store-room, which was held as inviolable and could only be entered by the pure and chaste. They were generally associated with the Lares, which were probably deified spirits of deceased ancestors of the family; but, though every family had two Penates, it had only one Lar. The image of the Lar, dressed in a toga or mantle, stood between those of the Penates, which were represented as dancing and drinking as a mark of jollity and abundance. The three images were sometimes indifferently spoken of as Penates or Lares and passed into a figure of speech for "home" and its concerns. *

Pencil (Lat. *penicillus*, "a little tail"), originally a small fine-pointed brush used in painting, such as the camel's hair and sable brushes used by artists and still called by this name, but now more commonly applied to a thin cylinder of some marking material enclosed in a wooden casing. Pencils in the widest sense are of unfathomable antiquity, dating from the first prehistoric man who traced a figure in the sand or scratched a likeness on a bone. The descent has been gradual, from the metal graver with which steel or stone was marked, or the characters impressed on Assyrian clay, through the stylus of the Roman, used upon wax tablets, to the latest invented patent pencil. The natives of China and Japan yet employ brushes for painting their letters. Sticks of coloured earths or chalks, generally called crayons, probably preceded the pencil as we now know it. The best graphite for the making of pencils comes from Siberia and other parts of Russia, and an inferior quality is found in Austria, Prussia, Ceylon, and North America. The lead is cased in cedar, the wood being cut into long strips of unequal thickness, in one of which a groove is made to receive the lead, the thinner slip being then glued or otherwise fastened to the body-piece. Pencils of various colours are made of clay, wax and tallow, the colour being obtained by the admixture of mineral matter of this or that hue. For copying or indelible pencils an aniline preparation mixed with clay and gum is used. There is a pencil in which the "lead" is firmly cased in paper which, when unwound, discloses a writing-point. Nuremberg is the centre of the pencil-making industry.

Pendulum is a body of any shape which oscillates about a fixed point or axis under the action of gravity. A simple pendulum is only a scientific conception and cannot practically exist, although we can obtain an arrangement which approaches very nearly to the ideal. Theoretically, it consists of a heavy particle suspended by a perfectly flexible weightless string. If an impulse be given to it in one direction only, the heavy point will move to and fro along the arc of a circle, oscillating on either side of its lowest point and its position of equilibrium. Let A represent the particle at its lowest point and B at its highest, the string being fixed at the point O. If the angle A O B be large, then it is a mathematical problem of some complexity to determine the motion of that particle. In the special case, however, when its velocity at A is just sufficient to take it round into a position vertically above O, we can obtain the curious result that it would take an infinite time to get there—that is, it would never reach the end of its journey. It is more profitable to consider the case when A O B is so small that its sine and circular measure are equal, when the whole problem is greatly simplified. The speed at which the particle moves reaches a maximum at A and is zero at B. Suppose the particle has been allowed to fall from the point B (A O B being small), and to have reached a point P (Fig. 1). Let A O B = α and A O P = θ , then it is possible to deduce the equation



$\theta = \alpha \cos. \frac{g}{l} t$, where t is the time which has elapsed since the particle left B, l is the length O A of the pendulum, and g is the acceleration due to gravity. α is called the amplitude of the swing, and a complete oscillation is two swings or a "swing-swing." The period is the time of a complete oscillation—that is, the time which elapses while the particle travels away from any point in its path and back again to the same point, its velocity in each case being in the same direction. A "complete oscillation" is sometimes referred to as a "double oscillation," and a swing is sometimes known as a "single oscillation." The period (τ) can be at once obtained from the above equation by putting $t + \tau$ instead of t , since nothing else has changed. Then we find that

$$\tau = 2\pi \sqrt{\frac{l}{g}}$$

At any spot on the earth's surface, then, the period of oscillation varies as the square-root of the length of the pendulum. A pendulum whose length is 4 inches will take twice as long to vibrate as one of 1 inch, while a particle at the end of a 9-inch string will take three times as long. By taking a pendulum of given length and measuring its period at different points on the earth, the relative values of g —the attraction of the earth—can be found for those points. Experimentally, the length of the seconds pendulum (one which takes two seconds for a complete oscillation) can be found; this for London is 39.1393 inches, and from this value the

above equation gives $g = 32.19$ foot-second units. In this way it has been found how far the figure of the earth differs from a true sphere, the value of g being greatest where the earth bulges most. So also by comparing the rates of vibration of a pendulum at the surface and in the depths of a coalmine it is possible to determine the average density of the earth.

In the case we have been considering, although the angle α is small, it can, of course, vary within certain limits, and it is then found (Fig. 2) that, whether we start the pendulum by letting it fall from B or some other point, C, the time taken for it to get to A, is the same. Hence the period is the same. This fact—that the period is independent of the amplitude of swing—is known as the isochronism of the pendulum, and although only true in this case for small amplitudes, is true entirely when the particle A is constrained to move in a cycloidal curve instead of a circle. In that case we may allow the particle to start from a point level with O, and it will take no longer to reach A than if we started it a few degrees away. It is this property of isochronism which gives the pendulum its immense value. Another very curious property was discovered by Foucault; this is that its plane of vibration appears to turn in the opposite way to the direction in which the earth rotates on its axis. The fact is that the pendulum, if set accurately moving in a straight line, maintains that direction absolutely in space, while the earth moves

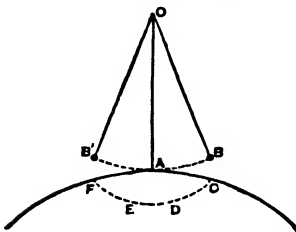


FIG. 3.

beneath it. The easiest case to consider is that of a pendulum swinging at the north pole, A (Fig. 3). It will swing in the same vertical plane, but gradually the points F C D B E will pass beneath it. In 24 hours one complete revolution will have been accomplished, and the pendulum will be swinging over the same points as at first. In any other latitude the rotation of the earth can be resolved into two components—one about a vertical and the other about a horizontal axis. If the latitude be λ , then the vertical component of the rotation is proportional to $\sin \lambda$, and since it is only this vertical component which has any effect, the time taken for a pendulum to complete its cycle of apparent changes in direction is $\frac{24 \text{ hours}}{\sin \lambda}$. At the

pole, $\lambda = 90^\circ$, so the above expression becomes 24 hours. At the equator λ and $\sin \lambda = 0$, so that it takes an infinite time for the pendulum to change its apparent plane—i.e., it does not change. If, then, we lived far down in the earth and could not see the apparent motions of the heavenly bodies, Foucault's pendulum would give us proof of the earth's rotation.

Although a simple pendulum was stated to be an ideal conception, yet a compound pendulum vibrates according to the same laws. In fact, we can calculate from the dimensions of a compound pendulum what would be the length of the simple equivalent pendulum—i.e., one that vibrates in the same time. The period of oscillation through a small angle for a compound pendulum is found to be

$$T = 2\pi \sqrt{\frac{k^2}{hg}}$$

where k is the radius of gyration of the compound pendulum about S, the centre of suspension (Fig. 4), and h is the distance between S and G, the centre of gravity. The length of the simple equivalent pendulum is, therefore, $l = \frac{k^2}{h}$. If we find the

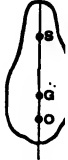


FIG. 4.

point O on the line SG in our compound pendulum such that $SO = l$, this point O is called the centre of oscillation of the pendulum, and the points S and O are interchangeable—that is, if either made the centre of suspension the other becomes the centre of oscillation, the period of vibration remaining the same in each case. It is upon this fact that the utility of Kater's pendulum depends.

Since the rate of oscillation depends upon the length of a pendulum, and since the length of an material is altered by heat, it follows that a pendulum of a clock would vibrate faster in winter, when it is coldest and therefore shorter than in summer. Various devices have been made to overcome this difficulty. Bars of metal expanding differently have been arranged in the "gridiron" pendulum so that the centre of gravity remains unaltered in position, while in the mercurial pendulum accuracy is obtained by careful adjustment of the quantity of quicksilver employed.

Penelope, the faithful wife of the Greek hero Odysseus (Ulysses), whose story is told in Homer's *Odyssey*. During the wanderings of her husband after the siege of Troy she was troubled by many suitors, but declared she could marry none till she had finished the winding-sheet of Laertes, Odysseus's father. Meanwhile, she always unravelled at night the part she had woven during the day, and thus her work was never ended. Her secret was discovered, through the perfidy of her maids, but after a time her husband's return relieved her from further annoyance, for Odysseus slew the importunate wooers.

Penguin, a bird belonging to the family Spheniscidae, with three genera—Spheniscus, Eudyptes and Aptenodytes—from the Antarctic and South Temperate regions. The body is elliptical, the head is small, and the neck and bill are moderately long. These birds are eminently aquatic, and when on land assume a nearly vertical position in walking or running. The wings are without quill and are covered with short, scale-like feathers which, in moulting, "flake off like the shedding of the skin of a serpent." The wings are, of course, functionless for flight, but make admirable swimming organs. The plumage, which covers the

whole body and is not disposed in feather-tracts, is black above and white beneath, with some white or yellow markings on the head and neck. The flesh is made by sailors into what they call, from the



PENGUIN.

flavour, "hare soup," and the plumage of the head and neck is used by furriers for collars. Among the largest and best-known species are the Emperor Penguin (*Aptenodytes patagonica*) and the King Penguin (*A. longirostris*).

Penicuik (Cymric, "the hill of the cuckoo"), a town of Edinburghshire, Scotland, on the left bank of the North Esk, 10 miles S. of Edinburgh. The great industry is paper-making, some of the mills being the largest in the country, and the mining of coal and ironstone are also carried on. Samuel Rutherford Crockett, the novelist, had his first and only charge here. Penicuik House (built in 1761) is the seat of the Clerks, a well-known county family, and Newhall in the vicinity was the scene of Allan Ramsay's *Gentle Shepherd*. The parish lies on the Pentland Hills. Pop. (1901), 3,574.

Peninsular and Oriental Company, a steamship Company familiarly known as the "P. & O.," was incorporated by royal charter in December, 1840, having started its career in 1837 as the Peninsular Company, founded by Messrs. Willcox and Anderson and Captain Bourne, R.N., which carried mails from London to Lisbon and Gibraltar. Its extension to the Far East dates from September 26th, 1842, when the *Hindustan*, a vessel of 1,800 tons and 500 h.p., left England for India *via* the Cape of Good Hope, an event of far-reaching importance. By 1844 the Company was able to undertake a mail service to Ceylon, Calcutta and Shanghai. The difficulties connected with the Overland Route (mainly a waterway) and the crossing of the Isthmus of Suez were overcome partly by the use of boats on the Mahmoudieh Canal and partly by the primitive means of a caravan across the desert from Cairo to Suez, a distance of less than 100 miles. No fewer than 3,000 camels were required to transport a single steamer's loading. This crude and inconvenient system continued for nearly twenty years, the annual value of the mer-

chandise being sometimes as much as forty millions sterling. In 1852 steam communication was extended to Australia, and in 1854 the service between Suez and Bombay, unwillingly relinquished by the East India Company, was taken over by the "P. & O." Since that date it has retained the British Mail service throughout the East under contracts open to public tender, and while greater speed has been attained the subsidy paid by the Government has been considerably reduced. When the railway from Alexandria to Suez was constructed the pace was accelerated, and when the Suez Canal was opened in 1869 the Overland traffic was practically extinguished. It was not until 1875, however, after the Company was reorganised and a new fleet built, that the service was transferred to the new canal. But the mails were carried by rail until 1888, when the Company reduced their charges and they were henceforth conveyed *via* Brindisi and the Suez Canal. The importance of the postal work may be inferred from the fact that 4,000 bags and boxes are usually carried by the Australia and India steamers. And while in 1873 twenty-three days was the time of transit from London to Bombay, it now occupies fourteen days. In 1873 the monthly service to Melbourne took forty-eight days; now the fortnightly service is performed in thirty-one days. The total of the fleet in 1900 was sixty-one ships costing seven millions sterling, of an average tonnage of 5,319 for each vessel, and several of the larger ships are under engagement with the Admiralty as cruisers. In 1899 their mileage reached three million miles, the consumption of coal was 625,000 tons and the dues to the Suez Canal Company exceeded £272,000.

Peninsular War, the name employed to denote the various campaigns of the French in Spain and Portugal between the years 1807 and 1814, their opponents being the Portuguese, the Spaniards, and, for most of the period, the British. When Napoleon's intrigues in Spain culminated in the abdication of Charles IV. and the appointment of Joseph Bonaparte as King of Spain, the Spanish resisted, receiving aid from Great Britain, first in money and supplies, and eventually in troops. Sir Arthur Wellesley was sent with an army to the Peninsula in 1808, but was soon superseded, though in 1809 he returned to it after the death of Sir John Moore at Corunna. Napoleon was called away by his campaign in Germany, just as, later, his Russian expedition prevented him from having a personal share in the Peninsular War. Though Wellesley, or Lord Wellington, as he soon became, drove Marshal Soult out of Portugal, he could not follow up his success, and was forced to retire within the lines of Torres Vedras, where he wearied out Soult, and in 1811 he again forced him to evacuate Portugal. Although the French had many successes, Wellington defeated Masséna in 1811 at Fuentes d'Onoro and Albuera, and took Ciudad Rodrigo in 1812. At one period the war threatened to languish indecisively, owing for a time to British red-tape but mainly in consequence of the lethargic and cumbersome routine

imposed by Spanish etiquette, but Wellington's appointment to the chief command of the Spanish and Portuguese armies in addition to that of his own forces enabled him to adopt more vigorous measures. In 1813 he defeated Soult in the battles of Vittoria and Nivelle, and the war ended with the battle of Toulouse, which took place after Napoleon's abdication. The historian of the campaigns was Sir W. P. Napier, whose work is one of the classics of English military literature.

Penitential Psalms. The 6th, 32nd, 38th, 51st, 102nd, 130th, and 143rd Psalms are so named as being particularly suited in the offices of the Church to express sorrow for sin. Their use is referred to by Origen, and in the 12th century Pope Innocent III. ordered their recitation in Lent. Later Popes have granted an indulgence for their recital. They have a special place in the Roman Breviary, and the 51st (the 50th in the Vulgate), known as the *Miserere*, which is most frequently used in public and private devotions, is sung to music by Allegri in the Sistine Chapel, at Rome, in Passion week. In the service of the Church of England these psalms are appointed to be specially used on Ash Wednesday.

Penmaenmawr, a town of Carnarvonshire, Wales, 4 miles W. by S. of Conway. It has been a favourite watering-place ever since W. E. Gladstone made it for several summers his seaside residence. The foundation-stone of St. Seiriol's was laid by the statesman in 1860. The adjoining mountain (1,553 feet high), on the summit of which are the remains of the ancient British fort of Dinas Penmaen and some circular cells, constitutes the northern extremity of the Snowdon range (or Snowdonia, as the tract is sometimes called). Pop. (1901), 3,503.

Penn, WILLIAM, the founder of the colony of Pennsylvania, was born in London on October 14th, 1644, and studied at Christ Church, Oxford, where he became a convert to Quakerism. The violence with which he attempted to assert his views led to his expulsion from the university, and his father, Admiral Sir William Penn, refused to receive him into his house. He allowed him to travel, however, hoping that new scenes would divert his thoughts from religion, and afterwards placed him in charge of his estates in Ireland; but Penn—though after his Continental tour and experiences his opinions seemed greatly relaxed—finally adhered most firmly to his convictions, and his father, perceiving the futility of all interference, became reconciled to him, and, at his death in 1670, left him his fortune. Meanwhile an attack on Anglican doctrines, entitled *The Sandy Foundation Shaken*, had resulted in Penn's imprisonment in the Tower (1668), where he consoled himself with the composition of *No Cross No Crown*. After a second imprisonment—this time in Newgate—in 1671, he travelled in Holland and Germany in support of Quakerism, which during the following decade he advocated and defended by precept and example in and out of season. In 1681 he received a grant of the fertile region north of Maryland and west of the Delaware in payment of the debts due from the Crown to his

father. In consequence of its wide forests, he gave it the name *Sylvania*, the first syllable being added by the king in honour of his father. On his arrival in the New World he laid out the town of Philadelphia, and for two years governed his colony with prudence and success, returning to England in 1684. Pennsylvania was quickly peopled by religious refugees and other



WILLIAM PENN.

immigrants from England, Holland, and Germany. During the reign of James II. Penn became very intimate with the king, who had been a close friend of his father's; he was even suspected of sharing his unconstitutional designs, but there appears to be no ground for the charges brought against him by Lord

Macaulay. He was deprived of his government in 1692, but received it again in 1694. His closing years were much hampered with debt, and he passed some time in the Fleet prison, London. He died at Ruscomb, in Berkshire, on July 30th, 1718.

Pen Names. [PSEUDONYMS.]

Pennant, THOMAS, traveller, antiquary, and naturalist, was born on his father's estate of Downing, in Flintshire, on June 14th, 1726, and studied at Queen's College, Oxford, but left without taking a degree. He manifested a taste for zoological and antiquarian pursuits early in life, and in 1754 became a Fellow of the Society of Antiquaries (resigning in 1760). In 1761 he began to work on his *British Zoology*, which was published five years later, and was elected F.R.S. in 1767. In 1769 he made his first tour in Scotland, of which he gave an entertaining account (1771). A second tour was made in 1772, of which also he published a record. "He's a Whig, sir, a sad dog," said Dr. Johnson in his defence. "But he's the best traveller I ever read; he observes more things than anyone else does." His love of itinerancy continued unimpaired till about 1780, and in 1778 he gave an account of several tours he had made in Wales in previous years. In 1781 he published his *History of Quadrupeds*, which was his own favourite among his works, and, in 1790, his invaluable book *Of London* appeared. Pennant died at Downing on December 16th, 1798.

Pennatulida, or SEA PENS, an order of Alcyonaria, characterised by the free habit of the colonies and the fact that the individuals or zooids occur usually on a long, central, rod-like skeleton.

The zooids are developed on two types, so that the colony is said to be dimorphic; the zooids are situated only on the upper exposed part of the colony, while the lower part is embedded in sand or mud. In some genera, such as the "Cock's comb" or *Pennatula*, the zooids are borne on lateral branches from the main stem; while in others, such as *Veretillum*, they are placed directly round the central stem. The best-known English member of the order is *Pennatula phosphoria*, a small species about three inches in length; it owes its specific name to its phosphorescence when irritated. The English members of the group were the subject of a monograph by Arthur Milnes Marshall (1852-93). The *Pennatulida* are all marine; a few fossil forms are known, such as the *Graphularia* of the London Clay, or *Pavonaria* of the Chalk. The Silurian fossil *Protovirgularia*, which has been referred to this order, is probably a *Graptolite*.

Pennsylvania, one of the thirteen original states of the American Union, bounded on the N. by Lake Erie and New York, on the E. by New York and New Jersey, on the S. by Delaware, Maryland and West Virginia, and on the W. by West Virginia and Ohio. It is situated between 39° 43' and 42° 15' N., and 74° 40' and 80° 36' W. The extreme length from east to west is 305 miles, the extreme breadth 158 miles, and the area 45,215 square miles. The surface is varied, but falls into three main divisions: a level district in the south-east, extending onwards to the Atlantic; a mountainous region in the centre, which forms part of the Appalachian system, consisting of low parallel ranges running from north-east to south-west and separated by parallel valleys; and an upland plateau in the north and west, from 1,000 to 2,500 feet above the sea, embracing one-half the area of the state. The mountainous region in the centre is in some places 100 miles broad. The principal rivers are the Delaware, which forms an irregular line along the eastern border; the Susquehanna, which flows through the middle portion of the state from north to south; the Juniata, which is the main affluent of the Susquehanna; and the Ohio, which is formed in the west by the union of the Alleghany and the Monongahela. The geological formation includes an Archaean region in the neighbourhood of Philadelphia, and Silurian and Devonian tracts, which extend into this state from that of New York, whilst west of the Alleghanies conglomerate rocks predominate. There are two great coal districts, the bituminous beds lying in the western part of the state, and the anthracites occupying the upland region between the Delaware and the Susquehanna. They are both sources of immense wealth, but the anthracite coal, which exists in Pennsylvania alone and is practically inexhaustible, is by far the more valuable. Natural gas is another important source of power. Near Pittsburgh, the centre of the bituminous district, occurred the great Homestead strike (1892), the most serious labour disturbance that has ever taken place in the United States. Iron ore is found in abundance, and large quantities of pig-iron are produced. The obtaining of petro-

leum is also an important industry. The manufactures are numerous and varied, especially at Philadelphia. In foundry and machine-shop products, textiles and carpets the state holds the premier position in the Union, and glass-making and ship-building are of first-rate importance. Agriculture is also in a very thriving condition, a comparatively small portion of the soil being incapable of cultivation. The chief crops are wheat, maize, oats, tobacco, potatoes, and hay. Fruit is raised in enormous quantities, and the wool-clip is very large. The more elevated districts afford good pasturage, and dairy-farming is carried on with great success. Owing to the vast quantities of timber, Pennsylvania occupies a leading position in the lumber trade, and the hemlock forests afford facilities for tanning. The original colony, established in 1681, owed its existence to the energy of William Penn. Philadelphia was laid out in 1682, in which year, too, Penn himself came to the colony and concluded a treaty with the Indians. The first Continental Congress met in Philadelphia in 1774, and in 1776 the Proprietary Government ended and a State Government was organised. The state was the theatre of many of the leading events of the Revolution, the Declaration of Independence being signed in Philadelphia. The mining population includes many Irish, Italians, and Hungarians. A considerable number of the tanners are descended from a German stock, and speak a language peculiar to themselves. Harrisburg (50,167) is the capital, but Philadelphia (1,293,697) and Pittsburgh (821,616) are the most important towns. Pop. (1900), 6,302,115.

Penny (probably derived from the root *pand*, "pawn" or "pledge") was first used in Saxon times, and consisted of silver to the amount of 22½ grs. troy, and the value of $\frac{1}{24}$ of the pound. The laws of Ina (7th century) mention it, and up to the time of Edward I. it was indented with a cross, which enabled it to be broken into halfpennies and farthings. Edward I. settled its weight at 24 grs., Edward III. at 18 grs., Edward VI. at 8 grs., and Elizabeth at 7½ grs. The coining of silver pennies for general circulation ceased with the reign of Charles II., though a small number have always been coined for Maundy money. Copper pennies date from 1797, and bronze coinage was introduced in 1860. The lighthouse that was once conspicuous on the Britannia side of the penny was designed after Smeaton's lighthouse on the Eddystone. The Irish and Manx pennies formerly coined for Ireland (till 1823) and the Isle of Man (last, 1839) were of equal value to the penny sterling, but had a different design on the reverse. The Scots penny, on the other hand, was only equal to $\frac{1}{4}$ of the English penny. The Scottish table is interesting:—

2 pennies = 1 bodle = $\frac{1}{4}$ d. sterling
2 bodles = 1 plack = $\frac{1}{4}$ d. sterling
3 placks = 12 pennies = 1 shilling = 1d. sterling.

Pennyroyal (*Mentha Pulegium*), a species of mint, with a peculiar and rather unpleasant smell. It is a native of Europe and Western Asia, and occurs abundantly in England and to some extent

in parts of Ireland, but is not found wild in Scotland. It is distilled for its essential oil, which is employed as a carminative and antispasmodic, and is credited with efficacy in female disorders. In the Eastern United States the allied *Hedeoma pulegioides* is similarly used under the same name, and an infusion of it is popular as a remedy for colds and rheumatism.

Penny Wedding, a wedding at which each of the guests contributed a small sum of money towards the cost of the entertainment and to the setting-up of the newly-married couple. It was only in vogue among the poorer classes in Scotland and Wales. Sir David Wilkie found in the custom a characteristic subject for the picture which he painted in 1818 for the Prince Regent, and which is now in the Royal collection.

Gloucester Arms, once called Dockwray Hall, preserves examples of carved woodwork and fine oak panelling. The industries include brewing, tanning, iron-founding and saw-mills, but the town is even more important as an agricultural centre, and the markets are largely attended. Penrith Castle, now very ruinous, was built in 1389 by Ralph Neville, Earl of Westmoreland. The Duke of Gloucester (afterwards Richard III.) is believed to have resided in it. During the Civil War it was occupied by the Parliamentary forces under Major-General Lambert, and was afterwards dismantled. Pop. (1901), 9,182.

Penryn, a town of Cornwall, England, at the head of a creek of Falmouth Harbour, 3 miles N.W. of Falmouth. The principal buildings are the Town Hall, reading-room, and temperance hall. The



PENSURST PLACE.

[Photo: Cassell & Co.]

Penobscots, North American Indians, a branch of the Abenaki or eastern Algonquians who occupied the coast district in the state of Maine about the Lower Penobscot river and neighbouring bay named from them. Most of these are now civilised and settled in the same district, where they form a small Roman Catholic community. Another group of a few hundreds have their camping grounds on the west side of Passamaquoddy Bay and around the shores of Lake Schoodic on the New Brunswick frontier.

Penrith, a town of Cumberland, England, in a valley near the Egmont, 18 miles S.E. of Carlisle. It is a place of great antiquity. The Roman road from York to Carlisle passed through the town, and in the St. Andrew's churchyard are the shafts of two crosses supposed to mark the graves of two giants: the cross-shafts are carved and bear alleged Runic inscriptions. The principal buildings are the Public Library and Museum, the Agricultural Hall, and the grammar school, founded in the 14th century and re-endowed by Queen Elizabeth. The Two Lions inn, an Elizabethan building, though altered, still presents interesting features, while the

chief industry is the dressing and polishing of granite, the quarries of which supplied the materials for Waterloo Bridge in London, Chatham Docks and other great public works. The manufactures are varied and include paper, chemical manures, flour, leather, and beer, besides engineering works and timber yard. Penryn became a municipal borough in the 13th century, and received its charter from James I. Pop. (1901), 3,190.

Penshurst, a village at the confluence of the Eden and Medway, Kent, England, 6 miles N.W. of Tunbridge Wells. The church of St. John the Baptist possesses great interest. It is mostly in the Late Perpendicular, but the north arcade of the nave is Early English. The north aisle is the mortuary chapel of the Sidneys. It contains the remains of Algernon Sidney, who was beheaded on Tower Hill, London, in 1683. The principal industry is the making of cricket bats and balls. Penshurst Place, a noble quadrangular edifice in the Tudor style, was the birthplace of Sir Philip and Algernon Sidney. The hall has a fine open roof and a Gothic woodwork screen. There is a remarkable collection of armour, paintings and

relics of Sir Philip Sidney, and the gardens are beautifully laid out. The mansion of Redleaf, also in this district, was the home of William Wells, one of the most sympathetic art patrons in the 19th century and the intimate friend of Sir Edwin Landseer, Frederick Goodall, W. P. Frith, and the leading painters of the period. He kept a room permanently equipped as a studio, in which his guests could work when the humour seized them; while in the "Redleaf Scribblers' Book" were hundreds of drawings and sketches in colour and black and white executed by artist-visitors.

Pension (Latin, *pensio*, a "paying out") has had various meanings. It was sometimes equivalent to an exhibition or allowance to a scholar, and the meeting of Benchers of Gray's Inn is called a pension; but the usual meaning now attached to the word is that of a grant or allowance—generally annual—bestowed on people, whose time of work is past, for services rendered. Such are State pensions, though in times past they were granted for far other reasons, and sometimes in perpetuity. State pensions as we know them in England are civil—granted to ministers of State, civil servants, authors or men of science; army pensions—granted to retired non-commissioned officers and soldiers, under varying conditions and of varying amounts; and navy pensions—which resemble in nature and conditions those of the army. Pensions are also, under certain conditions, made to widows, children, and parents of men entitled to them. Under the head of pensions may be classed the grant of money made to a winner of the Victoria Cross, if he be not of commissioned rank; the privilege to old soldiers of living in Chelsea Hospital; the "distinguished service reward" bestowed upon commissioned officers; and the money grants accompanying peerages or voted by Parliament for signal merit, as in the cases of the Duke of Marlborough, Lord Nelson, Lord Roberts and Lord Kitchener. In Holland the legal adviser in the large towns was called a pensionary, and in the time of the Dutch Republic the State secretary for the province of Holland was called *Raadspensionaris* (Grand Pensionary). The most famous occupants of the latter post (which was abolished in 1795) were Barneveldt, De Witt, and Heinsius.

Pentacrinus, the type-genus of the *Pentacrinidae*, one of the best-known families of Scallops. It was most abundant in Mesozoic times, and the joints of its stems are very common in some Oolitic and Liassic beds. The stems were in some cases 80 feet in height.

Pentameter, a verse of five feet, used in Latin and Greek poetry. The first half of the verse consists of two dactyls or spondees and a long syllable; the second half of two dactyls and a syllable. Hexameters and pentameters, used alternately, constitute elegiacs.

Pentane. The pentanes are hydrocarbons of the paraffin series, possessing the composition represented by C_5H_{12} . According to accepted chemical theory, three varieties should exist, and

all are known. Normal pentane is a colourless liquid, boiling at about $38^\circ F.$, which occurs in petroleum and light coal-tar oils. The isopentane boils at about 30° , and is the hydrocarbon of which the ordinary amyl compounds may be regarded as derivatives.

Pentateuch, the Greek name applied by Origen (adopted in Latin by Tertullian, and corresponding to the Jewish Torah or Law) to the first five books of the Old Testament—i.e., Genesis, Exodus, Leviticus, Numbers and Deuteronomy. They trace the history of the human race, from a Hebrew point of view, from the creation of the world to the death of Moses, the latter part of Deuteronomy being supposed to have been added by Joshua. It was formerly thought that the books were written by Moses, but modern criticism has shown this traditional view to be untenable, since there are two distinct elements—the Elohist and the Jahvist—contained in the writings. Others have held that the Pentateuch is of many ages; and others that it was chiefly written by Moses, with a possible revision by Ezra, and interpolations by others. The term Pentateuch is falling out of use, since the book of Joshua is now regarded as forming one continuous work with the other five, which have consequently been collectively denominated the Hexateuch.

Pentecost (Greek, "fiftieth"), a name used to represent (1) the Hebrew Feast of Weeks and thanksgiving for the first-fruits, which took place fifty days after the Passover; and (2) the Christian festival observed on the seventh Sunday after Easter in commemoration of the descent of the Holy Spirit upon the disciples on the day of Pentecost (Acts ii.) and of the first preaching of the Christian gospel. The day thus signified is Whit-Sunday, so named from the white robes worn by the newly-baptised, and is held as specially sacred to the Holy Ghost.

Pentland Firth, a strait between Caithness, Scotland, and the Orkneys. It measures 14 miles in length by from 6 to 8 miles in breadth. It contains several islands, of which the chief are the Skerries on the east, Stroma near the centre, and Swona, on the north, one of the Orkadian group. The currents present serious difficulties to mariners, as they cause numerous eddies and whirlpools, in some of which sailing ships are in imminent risk of being involved. From west to east the tide flows with a velocity of from six to ten miles an hour, probably the most rapid and certainly the most dangerous in British seas. Yet, notwithstanding these perils, so great is the convenience of the "short cut" from Norway and the North to the Atlantic that more than 5,000 cargo vessels use the channel every year.

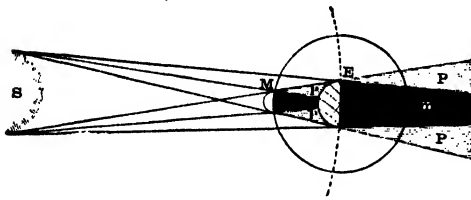
Pentland Hills, a range in the Lowlands of Scotland, extending in a south-westerly direction for a distance of 16 miles from about 4 miles south of Edinburgh through Mid Lothian and Peebles-shire to near Carnwath in Lanarkshire. The highest point is Scald Law (1,898 feet). Their out-june is generally rounded and of placid aspect, and

in most parts they afford good pasturage. The chief roads across them are by Glencorse Burn and Cauld Stane Slap. At Rullion Green, near Penicuik, the Covenanters were defeated, on November 28th, 1666, by the Royalists under Sir Thomas Dalryell, who earned an ill name by his brutality. Near Carlisle is the "Habbie's Howe" of Allan Ramsay's *Gentle Shepherd*.

Pentremites, the typical genus of the extinct order of Echinodermata known as the Blastoida. It is not found in England, for the species once referred to it are now known as *Granatocrinus*.

Pentstemon, a genus of Scrophulariaceæ, native to America, consisting of herbaceous perennials with opposite leaves and showy sub-campanulate, foxglove-like flowers of various colours, characterised by a rudimentary fifth stamen. They are favourite border plants.

Penumbra. When light from a point falls upon an object a shadow of that object is cast behind it—that is, there is a region of darkness caused by the interception of the rays of light by the object. When, however, light from a surface of appreciable size falls on an object, two kinds of shadows are cast, one being a region of complete darkness and the other of partial darkness only. It is this partially dark region which is known as the penumbra. This phenomenon is of special interest when the sun is the source of light. If E and S (see diagram) are the earth and sun, it will be obvious that there are two pairs of tangents to the circles representing sections of these bodies. The one pair meet behind E, and form the darkly-shaded region known as the *umbra*. The other two tangents cross in front of E, and into the region P—part of a cone—only some light can penetrate: this is the *penumbra*. If the moon M in her path enter these regions, we have an eclipse, the surface of the moon becoming gradually less and less



bright as she passes from penumbra to umbra. The presence of the earth's atmosphere causes the rays of light to be bent slightly, so that the two cones are somewhat distorted. Also, since some rays pass through more atmosphere than others, the refraction is unequal. This, combined with the fact that watery vapour transmits differently the different coloured rays which go to make up white light, causes the moon to appear coloured during an eclipse, the colour varying from penumbra to umbra.

Penza, a government of Russia in Europe, bounded on the N. by Nijni-Novgorod, on the E. by

Simbirsk, on the S. by Saratov, and on the W. by Tambov. It occupies an area of 14,997 square miles. The surface is undulating with deep valleys and ravines, but nowhere does it exceed 900 feet in height. The chief rivers are the Moksha, a tributary of the Oka, and the Sura, flowing to the Volga. The province is almost wholly agricultural, though a large area is still under forest. The principal crops are wheat, oats, potatoes, flax and tobacco, and there are vast numbers of horses, cattle and sheep. Bees are also a feature of the rural economy. The manufactures include paper, matches, oils and spirits, besides timber. Pop., 1,491,215. The capital, Penza, on the Sura, 350 miles S.E. of Moscow, has paper-, saw- and flour-mills and a pop. of 61,851.

Penzance, a seaport of Cornwall, England, pleasantly situated on Mount's Bay, 10 miles E.N.E. of Land's End. It is the most westerly town in England. Owing to its equable climate it has come into great repute as a health-resort. It is an important centre of the mackerel and pilchard fisheries, and possesses an excellent harbour. Market gardening and ship-building are also carried on, and the import and export trade is of growing consequence, fruit, flowers, potatoes and other vegetables being despatched in increasingly large quantities. There are saw-mills, iron foundries and tin smelting works in the vicinity. The principal structures, mostly constructed of granite, are the Public Buildings, which accommodate not only the Corporation offices, but also a large concert hall, a lecture room, the Royal Geological Society of Cornwall, and the Natural History and Antiquarian Society; the Market House (the old Town Hall), with a central dome, beneath which, on the first floor, is the corn market and, on the ground floor, the meat market; the School of Art and Free Library; the West Cornwall Infirmary and the Infectious Diseases Hospital. Morrab House (with grounds), acquired in 1889, has been partially turned to the purposes of a public library. Penzance is a meteorological station and is equipped with a rain-gauge in Morrab gardens, barometers on several edifices, and sunshine recorders on the Market Dome. There is a statue to Sir Humphry Davy, the famous chemist, who was born here on December 17th, 1778. The town was pillaged by the Spaniards in 1595 and sacked by Fairfax in 1646. Its charter was granted in 1615 and Charles II. made it an assaying or coinage town for tin, a position it held until 1838. Newlyn, a mile to the south-west, is so greatly affected by artists for the opportunities it offers of subjects, especially *en plein air*, that it has given rise to what is called the Newlyn School. Pop. (1901), 13,123.

Peony (*Paeonia*), a large genus of herbaceous and shrubby plants belonging to the Ranunculaceæ, characterised by a disc below the stamens and a fruit consisting of one, two, three, or five rather fleshy follicles. *P. corallina* grows on the Steep Holm, an island in the Severn, but is not indigenous. *P. officinalis* is the common large-flowered herbaceous peony of gardens; and *P. montan*, some-

times placed in a distinct genus on account of the disc growing up as an irregular cup round the five carpels, is the tree-peony, said to be native to Northern China, where it grows 10 feet high and is known as "Men-tang," the king of flowers. In English gardens it seldom reaches half that height. The flowers are white, pink, crimson or spotted, and in cultivation are generally double.

Peoria, capital of Peoria county, Illinois, United States, on the left bank of the Illinois, 160 miles S.W. of Chicago. It is an important railway centre, contains large distilleries, manufactures flour, oatmeal and starch, and carries on a considerable trade in grain. Pop. (1900), 56,100.

Pepin, or PIPPIN, THE LITTLE, the son of Charles Martel, and the founder of the Carolingian dynasty of Frankish kings, was born at Jupille, near Liège, Belgium, in 714. In 747 his brother, Carloman, withdrew to the monastery of Monte Cassino, and Pepin became Duke of Austrasia as well as Neustria. Four years later he obtained the consent of Pope Zacharias to the deposition of Childéric III., the last of the Merovingians; and in 752 he was consecrated king of the West Franks by Boniface, Archbishop of Mainz. He aimed at strengthening the power of the Franks by a close union with the Papacy, and readily responded to the call of Pope Stephen II., who sought his aid against the Lombard king, Aistulf (754). Eventually Aistulf was forced to become Pepin's tributary (756), and part of his territory was presented by the Frankish king to the Pope. Before this expedition Pepin had been solemnly crowned by Stephen at St. Denis. Thus his policy during these few years exercised a permanent influence on the course of mediæval history, at the same time laying the foundation of the temporal dominion of the Popes, and justifying their subsequent interference in the political affairs of Europe. Pepin's last years were spent in warfare, now with the Saxons, now with the Saracens, and now with the Duke of Aquitaine. He died at St. Denis on September 24th, 768.

Pepo, the gourd or fruit characteristic of most members of the order Cucurbitaceæ. It is syncarpous, inferior, one-chambered, generally many-seeded, horny externally when ripe, and fleshy or pulpy within. The chayote or chocho (*Seckium edule*) is exceptional in having only one large seed; the squirting cucumber (*Ecbalium agreste*) is characteristic in bursting violently from its fruit stalk and so discharging its seeds. The pepos of various types, such as the pumpkins and snake-gourds, attain to an enormous size and assume fantastic forms: the vascular bundles of those of the towel-gourd (*Luffa ægyptiaca*) are durable; whilst the British cucurbit, the white bryony (*Bryonia dioica*), has a berry instead of a pepo—*i.e.*, is not horny externally.

Pepper (*Piper*), the typical genus of the order Piperaceæ, which belongs to the Incompletæ. They are mostly climbing shrubs, natives of India and the Pacific, but now cultivated throughout the tropics. They have scattered, stipulate, petiolate, simple leaves and pendulous spikes of flowers.

P. nigrum yields the pepper of commerce. The fruit is red, is gathered when not fully ripe, and sun-dried, when it shrivel and turns black, being then known as a peppercorn. White pepper is the same fruit, with its outer coat rubbed off, but is sometimes bleached with chlorine. Pepper has been valued from early times. In the 5th century Attila the Hun is stated to have demanded 3,000 lbs. of pepper as part of the ransom of Rome. Pepper formed one of the small dying bequests of St. Bede to his comrades; and the now nominal feudal rent of peppercorns was once a reality. Malabar black pepper is the best, and Tellicherry and Penang white pepper. Ground pepper is adulterated with linseed, flour, ground rice, etc. Pepper is mainly used as a condiment, and owes its pungency to 2 per cent. of an essential oil. It also contains 2½ per cent. of the tasteless crystalline alkaloid piperin.

Peppercorn Rent, often formerly and still occasionally stipulated for as a quit-rent or nominal rent. The peppercorn is the dried berry of black pepper and of itself has practically no value. Property let, therefore, for such a return was intended as a favour or an act of grace and friendship. The exacting of a peppercorn or purely nominal rent, however, was legally prudent, since the landlord thereby secured all his rights.

Peppermint (*Mentha piperita*), a species of mint widely distributed throughout the temperate zone. The British species is cultivated for its aromatic essential oil at Mitcham (Surrey), Wisbeach (Cambridgeshire), Market Deeping (Lincoln), and Hitchin (Hertfordshire), but the plant is far more extensively reared in New York, Michigan, and Ohio. The whole plant, especially just before flowering, is rich in the oil, and when dried it yields three or four times more than when green. It is used for flavouring sweetmeats and cordials, to conceal the taste of medicines and alcoholic liquors, and as a carminative and stimulant, especially in flatulence. It is also one of the sources of menthol or Chinese oil of peppermint, $C_{10}H_{18} + H_2O$, which is used externally in neuralgia.

Peppermint, OIL OF, is the essential oil obtained by distillation from the peppermint plant, *Mentha piperita*. The oil is a colourless liquid with a pleasant odour and strong peculiar taste. It has a specific gravity of about .85, and acts strongly on polarised light. If cooled, crystals of menthol form in the liquid, and it is largely used as a source of this substance. Quantities are used in medicine as an anodyne, anti-spasmodic, and in cases of diarrhœa. It is also largely employed to disguise the obnoxious taste of medicines and for flavouring purposes, but the greatest quantity is employed for the production of peppermint lozenges.

Pepsin, a ferment found in gastric juice, capable, in the presence of weak acids, of converting proteins into peptones. For use in cases of indigestion it is introduced into the system as a medicine. The pepsin so used may be prepared from the inner surface of the stomach of calf, pig,

or sheep. The stomach is laid open, washed and scraped, the matter thus scraped off being spread on glass and dried at a gentle heat. A liquor with similar properties may be obtained by steeping the same part in glycerine. After eight days this liquor is strained, and for use a few drops may be taken in a glass of wine.

Peptones are proteid substances which are formed from all proteid material when it is subjected to the action of the gastric juice. They differ from most other proteids in their solubility and in certain of their chemical characteristics—as, *e.g.*, in not being coagulated by heat or thrown down as precipitates by mineral salts.

Pepys, SAMUEL, author of the famous *Diary*, was born on February 23rd, 1633, either in London or at Brampton, Huntingdonshire. He was descended from an old family which had fallen so



SAMUEL PEPYS.

(After the portrait by Sir Godfrey Kneller.)

far in the social scale that his father had become a tailor in London. He received his education in the town of Huntingdon, near which his uncle owned some property, and afterwards at St. Paul's School, London, whence he proceeded to Cambridge in 1650, entering Magdalene College in October of that year. In 1655 he imprudently married a beautiful girl of fifteen, but the young couple were rescued from poverty by Pepys's relative, Sir Edward Montagu (afterwards Earl of Sandwich), who received them into his house. In 1660 his patron's influence secured him the post of Clerk of the Acts of the Navy, the work of which he did with marked efficiency, inquiring into various abuses, and often being at his office at 4 o'clock in the morning. During the war with Holland, Monk called him the "right hand of the Navy." He remained at his post all through the visitation of the Plague. When the management of the Navy was called in question, after the appearance of the Dutch in the

Medway, Pepys defended the officials before the House of Commons in a speech of 3½ hours' duration, which was regarded as a triumphant vindication of the department. In 1673 he was appointed "secretary for the affairs of the Navy," and in the same year became member for Castle Rising. In 1676 he was master of Trinity House, and represented Harwich in the Short Parliament. In 1679-80 he was confined in London Tower for several months on a trumped-up charge of complicity in the Popish Plot. In 1683 he accompanied Lord Dartmouth in the Tangier expedition, and was chosen President of the Royal Society in the following year. Pepys became Secretary of the Admiralty in 1686, but at the Revolution lost his post, though the authorities continued to seek his advice on naval affairs. Henceforward he lived in lettered ease till his death at Clapham on May 26th, 1703. His *Diary*, giving in cipher an account of events from 1659 to 1669, remained in MS. till 1825, when it was published by Lord Braybrooke; but the whole of it was not given to the world till 1891. It is written with the utmost simplicity and candour, and is interesting both for its graphic picture of the court of Charles II. and the social life of the time, and for the study it affords of Pepys's own curiously complex character. Pepys was also author of *Memoirs relating to the State of the Royal Navy* (1690). The intelligence and zeal with which he discharged his duties made him a valuable public servant, and he earned a great reputation as an authority on matters connected with the Navy.

Peguods (PEQUOTS), North American Indians, members of the Algonquian family, formerly very powerful in the district west of Cape Cod (Massachusetts, Rhode Island, and Connecticut). They are constantly mentioned in the early annals of New England, but are now extinct.

Pera, the fashionable part of Constantinople, situated on the northern or right side of the Golden Horn. Most of the embassies have been erected in this district, which, owing to the character of its residents, is sometimes described as the Christian quarter. In 1870 it was devastated by fire, five thousand buildings being destroyed and forty thousand persons made homeless. It contains the Anglican church raised in memory of the British soldiers who fell in the Crimean war.

Perak, one of the Federated Malay States, situated on the western side of the Malay Peninsula, bounded on the N. by Province Wellesley and Kedah, on the E. by Pahang, Kelantan and Petani, on the S. by Selangor, and on the W. by the Strait of Malacca. It occupies an area of about 10,000 square miles, mostly covered by dense forest. The chief rivers are the Perak (with its left-hand tributaries, the Pils, Batang, Padang and Kinta), the Krian, Kurau, Larut, Bruas and Bernam. The two mountain ranges have an average altitude of 2,500 feet, but the highest point is 7,500 feet. They run parallel to each other, being separated by the valley of the Perak. The tin mines are the principal source of wealth, and gold and lead also occur. Rice, coffee, sugar, tea, tobacco, rubber, vanilla,

pepper and other spices are cultivated. The Dutch effected a settlement in 1650, but their occupation was always precarious and they abandoned it in 1783. They afterwards resumed possession, but were finally evicted by the British in 1795. The Siamese conquered the country in 1818, but its independence was guaranteed under treaty between Great Britain and Siam in 1824. For the next fifty years it was governed by its own Sultans, but such was the internal dissension that in 1874 the ruler applied for the help of a British Resident. The first Resident, Mr. J. W. W. Birch, being murdered in 1875, a punitive expedition ensued, and the protectorate then entered upon a peaceful and prosperous career. The state is divided into districts—Upper Perak, Kuala Kangsar and Lower Perak, on the Perak; Kinta, Larut and Krian. Krian is the most flourishing agricultural district, and Kinta and Larut are the leading mining quarters. Taiping, the chief town of Larut, is the administrative capital. Pop., 329,665.

Perceval, SPENCER, statesman, second son of John, Earl of Egmont, was born in London on November 1st, 1762, and educated at Harrow and Trinity College, Cambridge. He was called to the Bar in 1786, and entered Parliament as a supporter of Pitt in 1796. He became Solicitor-General in the Addington Administration in 1801, and Attorney-General in 1802. In 1807 he was made Chancellor of the Exchequer under the Duke of Portland, whom he succeeded as Premier in 1809. On the 11th of May, 1812, he was shot in the lobby of the House of Commons by a madman named John Bellingham, who resented the refusal of Government to interfere with the process of Russian law under which he had been arrested.

Perch, a fish belonging to the Acanthopterygian genus *Perca*, type of a family (Percide), with sixty-one genera, containing nearly five hundred species, from the rivers and coasts of temperate and tropical regions. The type-genus has three species, of which by far the best known is the river perch (*Perca fluviatilis*), fairly common in Great Britain and generally distributed over Europe and the northern parts of Asia and America, often coming down to brackish water. The upper surface is a warm greenish brown, shading into yellow on the sides, which are marked with broad dark vertical bands, reaching a little below the lateral line. Günther thinks five pounds the maximum weight, but much heavier specimens are said to have been taken. Perch feed on small fishes, insects and worms, and the female deposits her eggs on water plants. The flesh is esteemed for food. [CLIMBING PERCH.]

Perch, a rod of definite length employed in the measurement of land, palings, walls, etc. Though it varies locally, in standard measures a perch is equal to $5\frac{1}{2}$ yards or $16\frac{1}{2}$ feet. It is also called a pole or rod. The square rod, commonly used in estimating brickwork and masonry, contains $272\frac{1}{4}$ square feet. As a square measure a square perch is equal to $30\frac{1}{4}$ square yards, 160 perches making an acre.

Percival, THOMAS, physician, was born at Warrington, Lancashire, on September 29th, 1740, and educated at Warrington Grammar School and Academy. Deciding to become a doctor he went to Edinburgh to study medicine, and while yet a student was elected to the fellowship of the Royal Society, till then the youngest man ever admitted to that honour. Proceeding to Leyden in Holland he graduated there in 1765. Settling in Manchester (1767) he soon took a keen interest in matters of public health, and may be regarded as the earliest advocate of public baths and factory legislation. He was the founder of the Manchester Literary and Philosophical Society (1781), and contributed many papers on physical science to the Transactions of the Royal Society and other learned bodies. His *A Father's Instructions* (1775; 1800), a book for children, enjoyed a great vogue, and he was the author also of *Medical Ethics* (1803) and numerous important essays. He was instrumental in removing Warrington Academy, established to afford a collegiate education to Nonconformists (then debarred from attending Oxford and Cambridge Universities), to Manchester, and endeavoured in vain to promote a college of the type of that founded by John Owens in 1845. He died in Manchester on August 30th, 1804.

Percussion is a method of diagnosis which, as ordinarily employed, consists in placing the fingers of the left hand over the portion of the chest or other part of the human body to be examined, and in percussing or lightly striking them with the tips of the fingers of the right hand, so as to elicit a sound. On applying this method, for example, to the chest wall overlying the healthy lung a characteristic resonant percussion note is produced; if the chest wall overlying the heart is similarly examined, a dull sound results of quite a different character; while if the region overlying the stomach is percussed, what is known as a tympanic sound is evoked. By the employment of percussion, certain diseased conditions of deeply-seated organs can be detected. For example, consolidation of the lung in pneumonia, and the presence of effusion in the pleural cavity in pleurisy, both yield altered percussion sounds. Again, the altered texture of the lung in phthisis is accompanied by an altered percussion note, and changes in the form and area of the cardiac dulness are met with in certain forms of heart disease. The method of percussion was discovered by Leopold Auenbrugger (1722-1809), the famous German doctor, in 1761, and was greatly developed by René Théophile Hyacinthe Laennec (1781-1826), the celebrated French physician; it is commonly employed in conjunction with the method of diagnosis known as auscultation.

Percy, a noble English family, the name being derived, it is said, from Perci, a town in St. Lô, Lower Normandy (department of Manche). The first of the English Percys was LORD WILLIAM (1030-90), surnamed Algonon (*aka gerranus*, "with the moustaches"), who accompanied William the Conqueror to England, and obtained grants of land in Hampshire, Lincolnshire, and

Yorkshire in consideration of his services. He died in the Crusades, within view of the Holy City. At the death of his grandson, WILLIAM (flourished, 1116), the first race of the Percys ceased in the male line; but from one of the daughters of the last named (Agnes, who married Josceline de Louvain, who became 4th Baron Percy) a succession of distinguished men proceeded, notably HENRY, created Earl of Northumberland in 1377, whose son, SIR HENRY, called Hotspur (1364-1403), knighted at Windsor in 1377, Douglas's great adversary in the battle of Otterburn or Chevy Chase (1388), is the hero of many a romantic ballad, and immortalised by Shakespeare. With HENRY ALGERNON (1502-37), sixth earl, the peerage of the Percys terminated for twenty years, it being conferred on the Earl of Warwick by Edward VI. It was revived by Queen Mary in favour of THOMAS (1528-72), the seventh earl and nephew of the sixth. The title is held by the Duke of Northumberland (created, 1766), who is connected with the old Percys, through the female side only.

Percy, THOMAS, collector and editor of ballad literature, was born at Bridgnorth, Shropshire, on April 13th, 1729, and educated at Bridgnorth Grammar School and Christ Church, Oxford, where he graduated B.A. in 1750. Taking holy orders he was presented, in 1753, to the college living of Easton-Mauduit in Northamptonshire. His first literary work was a translation from the Chinese (1761), and this was followed, after one or two minor works, by his most remarkable production, *Reliques of Ancient English Poetry* (1765). The work—which consisted of a large number of the old ballads which had long been neglected and lost sight of, and which, with the willing help of many men of letters, Percy diligently collected from all quarters—excited great interest and admiration, and made its author famous. He became acquainted with Dr. Johnson, Burke, and other notable men, and in 1782 was appointed Bishop of Dromore in Ireland. Bishop Percy published various poems of his own, including *The Hermit of Warkworth*, in three cantos (1770), and wrote the popular song, "O Nannie, wilt thou gang wi' me?" He practised much benevolence in Dromore, where he died on September 30th, 1811. A valuable collection of *Ballads and Romances* (in 3 vols.) was published from his MSS. in 1867, under the editorship of Prof. J. W. Hales and Dr. F. J. Furnivall.

Percy Anecdotes, the name given to a collection of anecdotes, published in London in 20 volumes in 1821-3. They originally appeared in 44 monthly parts and professed to be written and compiled by "Sholto and Reuben Percy, brothers of the Benedictine monastery of Mount Bengier." Really Reuben Percy was Thomas Byerley (d. 1826), a journalist, while Sholto Percy was Joseph Clinton Robertson (1788-1852), a patent agent of Fleet Street. The name of the collection had nothing to do with the Percy *Reliques* but was taken from the Percy coffee-house in Rathbone Place, London, where the compilers used to discuss their project. Sir Richard Phillips (1767-1840), the pub-

lisher, complained that the notion of the compilation was borrowed from a proposal of his own that a collection should be made of the anecdotes that had appeared in the *Star* newspaper for many years. However that may be, in spite of the immense vogue which they enjoyed for many years, the *Percy Anecdotes* have small claim to authority or literary value.

Peregrine. [FALCON.]

Père-la-Chaise, the largest cemetery in Paris and the most famous burying-ground in the world. It is named after the Jesuit Father François d'Aix de Lachaise (1624-1709), confessor of Louis XIV., who built for him a mansion in the east of Paris on an estate then called Mont Louis. In 1804 the property was acquired for its present purpose and laid out by the architect Brongniart. It occupies over 200 acres and contains a Jewish and a Mahomedan burial-place, as well as a crematorium. Amongst the illustrious persons whose tombs are in the cemetery are Abélard and Héloïse, La Fontaine and Molière, Beaumarchais, Bernardin de Saint Pierre, Balzac, Béranger, Musset and Michelet, Ney, Masséna and Kellermann, Siéyès, Casimir-Périer, Thiers and Félix Faure, Lavoisier, Laplace, Bichat, Cuvier, Geoffroy-Saint-Hilaire, Gay Lussac, Arago and Claude Bernard, David, Géricault, Delacroix and Doré, Grétry, Méhul, Boieldieu, Hérold, Chopin, Rossini and Bizet, Talma, Clairon, Mars and Rachel.

Perennial ("living for several years"), a term applied either to plants which grow for several years before flowering and die after producing their first crop of fruit (monocarpic), or to those that, though commonly not flowering in the first few years of their life, afterwards produce successive crops (polycarpic). They may have perennial underground structures, the aerial branches dying down annually (herbaceous perennials), or they may form perennial structures above ground, as in ligneous plants (shrubs and trees).

Perez, ANTONIO, statesman, was born about 1540. His reputed father, Gonzalo Perez, was secretary of state to Philip II. and also translator of the *Odyssey* into Spanish. On the death of his father, Antonio replaced him as minister. Perez having accidentally learnt that Don John of Austria schemed to rescue Mary Queen of Scots, marry her and ascend the throne of England, with Philip's knowledge compassed the murder (1578) of Juan de Escovedo, Don John's confidant. For a time the king shielded him, but at last—partly owing to the importunities of the assassinated man's friends and partly owing to his alleged intrigues with a mistress of Philip's—set on foot proceedings intended to ruin Perez. He was arrested and imprisoned, and seemed on the point of being convicted as the murderer of Escovedo when he escaped into Aragon, thence to Béarn, and afterwards to England, where he arrived in 1593. Philip, who tried more than once to get him assassinated, was rendered even more furious by the account published by Perez in London (1594) of his relations with him. Perez went to France soon afterwards, and died in poverty at Paris in 1611.

Perfectibility, the opinion that in a state of grace through sanctification man may reach perfection; a condition of sinlessness in this life. This was a belief held by John Wesley although he allowed that few attained this high and holy position. Its origin is traceable to the great mystic known as Dionysius, by whom it was handed down through strict Franciscans, the Molinists, Jansenists and German Mystics. Unfortunately the theoretical Perfectibilist often became the practical Antinomian, as several sects prove, and the American Perfectionists, called also Free Lovers, who were banded together into a society by John H. Noyes, were constrained by public opinion to modify their principles. Some social reformers have held high ideals as to the perfectibility of the race. De Tocqueville's epitaph on Napoleon, "He was as great as a man can be without virtue," serves to prove that the complexity of our being requires that the moral and intellectual nature must be in harmony, a condition difficult of attainment in view of existing limitations. The cultivation of the intellect alone may give power either for good or evil.

Perfectionists (known also as the ONEIDA COMMUNITY, BIBLE COMMUNISTS, and FREE LOVERS) are a sect founded in the United States in 1838 by John Humphrey Noyes (born at Brattleboro, Vermont, September 3rd, 1811; died at Niagara Falls, Canada, April 13th, 1886). Having come to the conclusion that the Church as such hardly outlasted apostolic times, and that with the Second Advent, which he placed in the year 70, it came to an end, and that from that time forward it consisted in different times and places, of such people only, independent of priesthood or visible membership, as carried out the apostolic ideal, he conceived the idea of founding a visible church upon similar lines, the chief features of which were to be community of goods and freedom from all rules and laws, and from human ties of country, marriage, and family, since each member, by strength of the indwelling Spirit, would be a law to himself. Such a society was duly established at Oneida, in Madison county, New York, in 1848. It engaged in the iron and silk industry and devised a trap for fur-hunting which had a great success. Apparently the society was conducted without scandal. In course of time, however, local public opinion denounced their views and practices and accordingly, in 1880, the society reintroduced marriage and family life, and modified its community of goods so far as to resolve itself into the Oneida Joint Stock Company, each member sharing in the profits. Its business transactions, carried on on co-operative principles, continued to be prosperous.

Perforata. (1) A subdivision of the Foraminifera, including those in which the test or shell is perforated by a large number of pores through which pass the pseudopodia or tentacle-like expansions of the body substance. The three main families are the Lagenidae, Globigerinidae, and Nummulinidae. (2) One of the three sub-orders of the order Madreporaria, or true corals, so called owing to the porous nature of the skeleton or

corallium. It includes the most specialised of existing corals. There are three main families—the Poritidae, including many massive forms composed of spongy tissue; the Eupsammidae, a group of branching tree-like corals; and the Madreporidae, including the common Stag's-Horn Coral, and others of the best-known members of the order.

Perfumery, the art of extracting odours from flowers, fruits, and other substances, and recombining them for use in the toilet and for other purposes. Perfumes were known to and used by the Egyptians, Phœnicians, Assyrians, and Persians, and were used by the Greeks and Romans in worship, for the toilet, and for rendering wines more agreeable. Perfumes were adopted into Christian worship as early as the 5th century. The Arabs brought the art into Spain, and it was quickly adopted and improved upon in France and Italy, though in the latter country the employment of perfumes in the fine art of poisoning led to their passing out of fashion and popularity. Perfumes were popular in England during the 15th and 16th centuries, since which time their use has considerably diminished, so far, at least, as men are concerned. Paris and London are the chief seats of the manufacture, while Cannes, Nice, Nîmes, Sicily, and other places in Southern Europe provide quantities of the choicest flowers and fruits. Bulgaria is noted for its attar of rose, and England holds her own in the matter of lavender and peppermint, which are largely cultivated at Mitcham and Hitchin.

Pergamum, or PERGAMUS, an ancient city of Mysia, in Asia Minor, was situated on the northern bank of the Caicus (modern, Bakir-Tchali), which at that time communicated directly with the sea. The town centred round the Acropolis, which was on a hill behind it. Founded by a colony of Greek emigrants, it had already become important in the early part of the 3rd century B.C. As part of the territory conquered by Alexander the Great, it was ruled by his general Lysimachus; but a eunuch named Philetærus, whom the latter had entrusted with the care of his treasure, rebelled and made it an independent state, and such it remained till 133 B.C., when Attalus III. bequeathed it to the Roman Empire, of which it became a province. Under Byzantine rule it gradually fell into decay; but many things testify to its former greatness. It had a library second only to that of Alexandria, and St. John speaks of its church as one of the seven churches of Asia. There are remains of noble architecture in and about the town of Pergama, which now occupies its site. Pergamus gives us the word "parchment," the substance having been probably first used there.

Pergolesi, GIOVANNI BATTISTA, composer, was born at Jesi, Ancona, Italy, on January 3rd, 1710, and was taught the violin at Naples. His compositions are chiefly masses and operas, which obtained little success during his lifetime. His early death at Pozzuoli on March 16th, 1736, excited profound regret and his *La Serva Padrona* (1731), *Maestro di Musica* (1732), *Flaminio* (1735), and *L'Olimpiade* (1735), performed

posthumously, achieved widespread popularity. His last compositions were *Orfeo ed Euridice*, a cantata for a single voice, a beautiful *Salve, Regina*, also for a single voice, and his famous *Stabat Mater* for two female voices. Pathos and sweetness are the leading characteristics of his works.

Peri, in Persian mythology, an imaginary being, of either sex, a descendant of the fallen angels, supposed to be immortal, and to lead a life of happiness, but to be excluded from Paradise until the repentance of the fallen angels. Thomas Moore wrote a much admired poem "Paradise and the Peri," which formed a section of *Lalla Rookh*.

Perianth, a convenient general term for the floral envelopes [FLOWER], employed more especially when there is either only one whorl of them (monochlamydeous) or two whorls of similar texture, as in many Monocotyledons. It may thus be petaloid in colour and texture, as in lilies, tulips, Narcissus, etc.; herbaceous, as in nettles; or glumaceous, as in rushes; and either gamophyllous, with united leaves, as in hyacinths; or polyphyllous, when they are free, as in lilies.

Pericambium, or, as it is now termed, pericycle, a ring of tissue surrounding the stele in roots or stems. It may be homogeneously composed of thin-walled parenchyma, or it may be heterogeneous, containing a circle, or detached strands, of sclerenchyma, either sclerenchymatous or collenchymatous. In it the lateral branches of the root originate.

Pericardium, the space surrounding the heart; it is of great functional importance in some invertebrates, such as the mollusca, in which it communicates with the exterior by means of the kidney or nephridium. In the vertebrates it is completely closed. In the human subject the pericardium is liable to inflammation as the result of exposure to cold, especially when the exposure leads up to rheumatic fever. In this condition, which is known as *pericarditis*, a certain quantity of fluid fills the cavity of the pericardium, while a layer of solid matter forms on its surface. Besides pain and tenderness in the heart region, there are palpitation, faintness, blueness of the face and lips, cough, difficulty of breathing, general symptoms of fever and a frequent, feeble pulse. In severe cases the fluid poured out may amount to several pints, seriously affecting the heart's action and causing permanent injury, the heart and pericardium becoming fixed together by bands and cords. It is in consequence of the gravity of many of its sequelæ that rheumatic fever should be treated professionally at the earliest possible moment.

Pericarp, the wall of the ovary of angiosperms in the fruit stage, *i.e.*, the whole of a true fruit exclusive of the seeds it contains. The term is loosely extended to the similar (analogous) structure in inferior fruits or pseudocarps, which is not identical in homology, being largely receptacular and not ovarian in origin. The pericarp may be dry or succulent. In the former case, as in the pea, it is generally dehiscent if many-seeded; inde-

hiscent, as in buckwheat, if one-seeded. If fleshy, it is often readily distinguishable into three layers, the exterior skin or epicarp, the middle fleshy layer, mesocarp or sarcocarp, and the inner stone, the putamen or endocarp.

Pericles, greatest of Athenian statesmen, was born about the close of the 6th century B.C. He was of noble descent, and was the son of Xanthippus, who routed the Persians at Mycale in 479 B.C. He was educated by the best masters obtainable, among them being Zeno the Eleatic, and Anaxagoras. About 467 he entered public life as a member of the democratic party, and soon became its leader. He differed from many of his powerful opponents in having few traces of the demagogue about him; nor did he depend upon the generous distribution of money for supporters. Cimon, the leader of the aristocratic party, has been credited with the merit of putting an end to the long war with Persia; but it was Pericles's moderation, sagacity, and dignity which brought about that result. His magnanimity was seen in the action he took after the banishment of Cimon in passing a decree enabling Cimon to return. He had been impressed with the latter's patriotism and bravery in offering to fight at the battle of Tanagra (457) as a common soldier. Pericles disapproved of the spirited foreign policy of his day, and tried to curb the impulsive enterprise of the Athenians, who were continually seeking to conquer new worlds. He wished to unite the Grecian states, which were at enmity, instead of waging war on other nations while weakened by division. He proposed that delegates from all the Hellenic states should meet at Athens; but the jealousy and envy of Sparta prevented the realisation of his patriotic idea. The Athenians, however, united, and by a series of brilliant victories, which were largely due to Pericles's strategy and courage, gradually extended their influence and possessions from the isthmus of Corinth to the Thermopylæan Strait. After the death of Cimon (449) and banishment of his successor, Thucydides, son of Melesias, his power was almost absolute. He subdued several states and forced tribute from them, and the treasury of the Athenian confederacy was removed during this period from Delos to Athens. He settled colonies in various places and rendered Athens almost impregnable by the building of walls. Under his wise rule noble edifices arose in Athens, adorned with the choicest examples of Grecian art—amongst them the Parthenon, the Erechtheum, the Propylæa, or vestibule to the Acropolis, and the Odeum, or music-hall—the theatre was encouraged, and some important legal reforms were effected, his jury system standing the test of many generations. Sparta and other Grecian states, envious of Athens, conspired to humble it, and hence the Peloponnesian War. Pericles's strategy was not approved of at first, but he succeeded in his plans. Unfortunately the plague broke out in Athens, and the people turned on him. When the reaction came he had lost some of his dearest friends and relatives and at length, in 429 B.C., he succumbed. [ASPASIA.] His orations have not been preserved, though one of them

was pronounced the greatest of all ancient compositions. His fame rests on his wisdom, foresight, and splendid administrative power and military genius.

Périer, CASIMIR, statesman, was born at Grenoble, France, on October 11th, 1777, and educated at Lyons and Paris. After military service in Italy, he entered his brother's bank in Paris and acquired a complete mastery of finance. Having exposed the deplorable condition of the ministerial budget, he was elected to the Chamber of Deputies (1817), where he continued to keep a vigilant eye upon the national purse. After the Revolution of July, 1830, he became President of the Chamber and, in 1832, President of the Council with the portfolio of the Interior. Strongly deprecating change for change's sake, he adopted the policy of the *juste milieu*, or "golden mean," during which the country might be allowed breathing-time to recover prosperity and "tone." He did not live to see what measure of success his statesmanship might achieve, for he fell a victim to cholera and died in Paris on May 16th, 1832.

Périer, JEAN PAUL PIERRE CASIMIR, fifth President of the French Republic, grandson of Louis Philippe's premier, was born in Paris on November 8th, 1847, and was educated at the Lycée Bonaparte. After serving in the Franco-German war (in which he won the Legion of Honour), he entered public life as deputy for Nogent-sur-Seine (1876). From 1877 to 1879 he was Under-Secretary for Education, but resigned his seat in the Chamber (February, 1883) as a protest against the vote which deprived the princes of the House of Orleans of their rank in the army. His constituents, however, re-elected him, and he filled in succession the posts of Under-Secretary for War (October, 1883), Vice-President of the Chamber (1886), President of the Budget Committee (1891-2, 1893) and President of the Chamber (1893). On the fall of the Dupuy Cabinet he became premier with the portfolio of Foreign Affairs (December, 1893). He did not hold office long, being defeated in May, 1894, on a question of secondary importance. On June 24th in this year President Carnot was assassinated at Lyons and Casimir-Périer was elected his successor three days later. A prolonged series of violent demonstrations in the Chamber, in which his authority was constantly flouted and sought to be circumscribed, led him to end the discreditable turmoil by resigning his high office on the 15th of January, 1895. This was a salutary and not unneeded lesson and brought the Deputies to their senses.

Perigee, the point of the moon's orbit which is nearest to the earth. On account of the disturbing force of the sun and the planets, the perigee does not retain the same position, but makes a complete revolution in about nine years. This motion, however, is not regular, the true position of the perigee sometimes being as much as 12° away from its mean place. This irregularity was known in very early times, but Jeremiah Horrocks (1617-41) was the first astronomer who deduced the law which determines its change.

Périgord, an ancient province in the south-west of France. It formed part of Guienne, in the old government of Guienne and Gascony, and was bounded on the N.W. by Saintonge and the Angoumois, on the N. and N.E. by Limousin, on the E. and S.E. by Quercy, on the S. by Agenais, and on the W. by Guienne. Its principal towns were Périgueux, Sarlat and Bergerac. It was divided into Périgord Blanc or Upper Périgord, with Périgueux as the capital, and Périgord Noir or Sarladais, with Sarlat as capital, and is now represented by the department of Dordogne and part of that of Lot-et-Garonne.

Périgueux, capital of the department of Dordogne, France, on the Isle, a right-hand affluent of the Dordogne, 70 miles N.E. of Bordeaux. It is well situated amid pleasant surroundings, and has some fine buildings, among them being the Byzantine cathedral of St. Front (with lofty towers and cupolas), resembling St. Mark's in Venice, the Prefecture, the Palais de Justice, and the Museum. The chief industries are the manufacture of bombazines, serge, cutlery, hosiery, leather, liquors and spirits, pâtés, pottery and nails, and much marble is cut and polished. The *pâtés de Périgueux*, made of truffles and partridges, are largely exported. Among the Roman remains are an amphitheatre, aqueducts, temples, and a curious tower 67 feet high and containing no door or window. Périgueux was the Roman Vesunna, the capital of the Petrocorii, whose name was preserved in that of Périgord, the ancient province of which Périgueux was capital. Captured by the English in 1356 it was restored to France in the reign of Charles V. In the wars of the Huguenots the town was a Calvinist stronghold. Pop. (1901), 31,976.

Perihelion, the point of a planet's orbit which is nearest the sun. It is therefore one end of the major axis of the ellipse which represents the planet's path, and it is when in perihelion that a planet is travelling fastest.

Perim, a small barren island in the Strait of Bab-el-Mandeb, at the entrance or southern end of the Red Sea. It has been occupied by Great Britain since 1857, and is used as a coaling and telegraph station. The inhabitants number about 400, mostly coolies engaged in coal-heaving.

Perineum, the term applied in anatomy to the portion of the body situate at the floor of the pelvis, and traversed by the extremity of the lower bowel and by the urethra.

Periodicals, publications appearing at regular (or, occasionally, uncertain) intervals dealing with literature, science and art, crafts and trades, political, social and general topics; distinct, on the one hand, from newspapers, and, on the other, from the journals of learned societies, almanacs and year-books. Periodicals appear, usually, once a week, monthly or quarterly. They are either general and promiscuous, i.e., they appeal to all, or large sections of the community, or specific, i.e., they deal with one subject (for example, philosophy or cricket), and make their appeal only to those interested in that subject. To this second class it is unnecessary

to refer at any length. The general periodical is of three kinds, the political and critical review, the miscellaneous magazine, and the popular journal of the penny weekly type. The dividing line between these varieties cannot, however, always be distinguished.

Periodicals grew out of the newspapers, and dealt originally with books and literature. The earliest publication of this kind was the *Journal des Savants*, which appeared in Paris in 1665. It has had a chequered career and intervals of oblivion, but still exists and is controlled by a commission of the Institut. The *Journal* speedily found imitators in England, but it was not until the publication of the *History of the Works of the Learned* (1699-1712) that any critical periodical achieved much success in London. It is to the genius of Richard Steele, Joseph Addison and Samuel Johnson that the popularity of the non-newspaper periodical was originally due. Steele began the *Tatler* in 1709 and thrice a week for close on three years came essays from his pen in this publication. Addison and Steele established the *Spectator* in 1710 and it lasted for four years. Johnson's *Rambler* was published from 20th March, 1750, to 14th March, 1752. Meanwhile the *Monthly Review* (1749-1845) had appeared. It dealt with science and literature, was Whig in politics and Nonconformist in theology. It was the forerunner of the great critical reviews of to-day. Of these the most important are the *Edinburgh Review*, established in 1802 and indelibly associated with the names of Francis Jeffrey, Sydney Smith, Brougham (who largely determined its early Whig views), Sir Walter Scott, Thomas Carlyle, and, after 1825, Macaulay. Scott, dissatisfied with the *Edinburgh*, induced John Murray to start a rival, and in 1809 the first number of the *Quarterly Review* was published. Among the great names early associated with the *Quarterly* were those of William Gifford and J. G. Lockhart, and in its mid-career Sir William Smith was editor. For nearly a century the articles in the two great quarterlies were anonymous, but at the beginning of the 20th century signed articles made their appearance. The *Westminster Review*, the organ at first of the Utilitarians, was published in 1824 as a quarterly, and so continued for over half a century and still exists as a monthly. The *Dublin Review* (established 1836) is the quarterly organ of the cultured section of the Roman Catholic community.

The quarterlies wielded much political and literary influence, but as the reading—if not the reflective—public grew in numbers, something more popular seemed to be required, and in 1865 the *Fortnightly Review* was founded, the signing of articles being designed to fix responsibility on the authors rather than on the *Review*. As its name implies, its first came out fortnightly, but in 1866 the issues were made monthly though the original title was retained. From 1867 to 1882 it was edited by John Morley. The *Fortnightly* was followed by the *Contemporary Review* (1866), the *Nineteenth Century* (1877), the words and *Afterwards* being added in 1901; the *National Review* (1883), and the *Monthly Review* (1900). In all these monthly reviews, political, social and theological questions have far

more prominence than literary criticism. While the quarterlies charge six shillings a number the monthlies are content to charge two shillings and sixpence.

The modern magazine (the use of the name in this connection may be traced to the intention that this kind of periodical should be a repository of miscellaneous literary wares) claims descent from the *Gentleman's Journal* (1691-4), while the still-existing *Gentleman's Magazine* (founded in 1731 by Edward Cave) owed much of its early success to the contributions of Dr. Johnson. In it he reported, largely from his own imagination, the speeches delivered in Parliament, taking care "not to let the Whig dogs have the best of it." "Sylvanus Urban, Gent.," the constant pseudonym of the editor, no longer displays the special interest in antiquarian and historical lore that he was wont to do, his miscellany being now devoted to general literature and fiction. Even more notable than the establishment of the *Gentleman's Magazine* was the appearance at Edinburgh in 1817 of *Blackwood's Magazine*, issued by the founder of the well-known publishing house. Brilliant, witty, audacious, Tory in politics, Liberal in matters literary, its early contributors included John Wilson ("Christopher North") as editor, Sir Walter Scott, Lockhart and James Hogg, "the Ettrick Shepherd." The great reputation which it at once achieved it has maintained to the present day. It combines the best features of the "heavy" review and the "light" magazine. *Fraser's Magazine* was founded in 1830, changed its name in 1882 to *Longman's Magazine*, and in 1905 ceased to exist. In its early days associated with the names of Carlyle and Thackeray, among its latest contributors was Andrew Lang.

In 1859 *Macmillan's Magazine* was published monthly at the price of a shilling, and in 1860 appeared the *Cornhill Magazine* under the editorship of Thackeray, on whose staff was Frederick Greenwood, subsequently founder of the *Pull Mall Gazette* and *St. James's Gazette*. The *Cornhill* maintains a high literary reputation. Some forty years after its foundation, the proprietor, George Smith (of Smith, Elder & Co.), gave in its pages interesting reminiscences of its early days. The two magazines named were not, however, the first periodicals of their kind published at a shilling; that distinction belonging to *Tait's Edinburgh Journal* (1832-46), which did not survive the competition of its rivals. It was felt, too, that there had grown up a public sufficiently large to make the issue of a sixpenny magazine successful. In 1852 the *Leisure Hour* was first published. It had a distinctly religious tone, and was followed in 1860 by *Good Words*, and in 1861 by the *Quiver*. Both were sixpenny monthlies, and both had illustrations. In 1906 *Good Words*, to which W. E. Gladstone and many other eminent men had contributed, was changed into a penny weekly. The beginnings of high-class illustrated periodicals are found not in England, nor in the magazines named, but in the United States. *Harper's Magazine*, whose excellence, literary and pictorial, has long been recognised, was first published in 1850. In 1870 appeared *Scribner's Monthly* (changed in 1881

to the *Century Magazine*), a journal of similar class and reputation. In 1887 publication began of a third high-class illustrated American periodical—*Scribner's Magazine*. In England the *Art Journal*, noted for its line engravings, had appeared as far back as 1839, but its appeal was necessarily to a somewhat limited class.

The pioneer periodical to give, at a popular price, the best illustrations and letterpress by the first authors of the day, was *Cassell's Magazine* (1853, then called *Cassell's Illustrated Family Paper*), which has numbered amongst its contributors Charles Reade, Wilkie Collins, Sheridan Le Fanu, Rudyard Kipling, Max Pemberton, and H. Rider Haggard. For many years the chief magazines have printed the works of leading novelists, and as far back as 1837 *Bentley's Miscellany* was devoted entirely to fiction, while later *Temple Bar* (which ceased to be published in 1907), *Belgravia* and the *Argosy* were almost wholly given up to that art. In 1891 the *Strand Magazine*, projected by Sir George Newnes, came out as a sixpenny illustrated monthly, with much light reading and plenty of fiction. By its success it proved the forerunner of a number of other magazines of similar kind. At one time it may have been doubted whether children felt sufficient *esprit de corps* to support a magazine exclusively devoted to their interests, but the increasing success of *Little Folks* (1871) has demonstrated that they appreciate as zealously as readers of an older growth a periodical that gives them exactly what they want. A magazine of a novel character was brought out in 1890 under the editorship of W. T. Stead. This was the *Review of Reviews*, which, besides original contributions, including character sketches of eminent persons, gave a digest of the principal contents of contemporary magazines and reviews. A class magazine which merits mention is *Notes and Queries* (1849), specially devoted to the elucidation of obscure points of literary and antiquarian interest.

another pioneer of cheap healthy literature. The *Family Herald* (1843) and the *London Journal* (1845) are penny weeklies devoted to fiction, the progenitors of the numerous penny novelettes and exponents of the bad baronet and virtuous penniless maiden school of fictive art. Journals associated with Charles Dickens are *Household Words* (1850) and *All the Year Round* (1859), while in *Once a Week* (1859) appeared some of the work of Sir Walter Besant and James Rice. In 1881 a paper destined to have a great influence on the mass of the reading public was published by George Newnes. This was *Tit Bits*, which aimed at being bright, breezy and brief. It was also scrappy, it offered prizes to its readers, and was immensely successful. Among its best-known rivals are *Cassell's Saturday Journal* (1883), *Answers* [to correspondents] (1888), and *Pearson's Weekly* (1890).

The development of periodical literature in the United States, France and Germany has been almost as great as in England. The reviews in America have not the authority of their European rivals; the most familiar is the *North American Review* (Boston, 1815). Of magazines, besides those already mentioned, *The Atlantic Monthly* (Boston, 1857) holds a very high place, as does also *Lippincott's Magazine* (Philadelphia, 1868). In Paris the leading periodical is the *Revue des Deux Mondes* (founded in 1829). The *Nouvelle Revue* was established in 1879. German periodicals are very numerous, but no one has obtained a position of pre-eminence. The *Deutsche Rundschau* (1874) and *Nord und Sud* (1878) may be mentioned. Turin has its *Rivista Contemporanea* (1853) and Rome the *Giornale degli eruditi* (1883).

Periodic Law. It was first observed in the year 1864 by Newlands that if the elements be arranged in the order of their atomic weights [ATOMIC THEORY], those which showed relationship to one another in their chemical characteristics

H=1

Li 7	Be 9	B 11	C 12	N 14	O 16	F 19	
Na 23	Mg 24	Al 27	Si 28	P 31	S 32	Cl 35.5	
K 39	Ca 40	Sc 44	Ti 48	V 51	Cr 52	Mn 55	$\left\{ \begin{array}{l} \text{Fe 56} \\ \text{Co 58} \\ \text{Ni 58} \end{array} \right.$
Cu 63	Zn 65	Ga 70	Ge 73	As 75	Se 79	Br 80	
Rb 85	Sr 87	Y 89	Zr 90	Nb 94	Mo 96	—	
Ag 108	Cd 112	In 113	Su 117	Sb 120	Te 126	I 126.5	$\left\{ \begin{array}{l} \text{Ru 104} \\ \text{Rh 104} \\ \text{Pd 106} \end{array} \right.$
Cs 133	Ba 137	La 139	Ce 140	Di 142	Sm 151	—	
—	—	—	—	Ta 182	W 184	—	
Au 197	Hg 200	Tl 204	Pb 206	Bi 210	—	—	$\left\{ \begin{array}{l} \text{Os 190} \\ \text{Ir 198} \\ \text{Pt 195} \end{array} \right.$
—	Ra 228	—	Th 232	—	U 240	—	

The popular weekly periodical dates from the appearance in Edinburgh of *Chambers's Journal* (1832), at the price of three halfpence a copy. It is also sold in monthly parts, and maintains the best literary traditions, but eschews politics. Charles Knight's *Penny Magazine* (1832-45) was

occurred at regular intervals. These elements were then classified in groups in accordance with this periodicity and, after further extension by Mendeleef and Lothar Meyer, the classification received general recognition amongst chemists, and might be said to take the form of a law which stated

that the chemical and physical properties of the elements are functions of their atomic weights. The arrangement of the elements in the periodic system is generally given according to the table on the preceding page.

It will be seen that the elements in the vertical groups are such as closely resemble one another chemically. The periodic law has been of service in checking the atomic weights of the elements. Thus these weights in the case of Tellurium and Osmium were greater than they should be; but careful redeterminations showed the old numbers were too high. On the basis of this system also, Mendeleef predicted the existence of elements which should fill some of the gaps in the order. He also predicted the properties of these elements, his assumption being afterwards verified by the discovery of the elements Scandium and Germanium. Not least also in the uses of this discovery has been the great influence which it has had upon chemical thought and work.

Periodic Time, the time taken by any planet to travel once round its orbit. The periodic time of an inferior planet is found by noting the time which elapses between two successive conjunctions, and that of a superior planet by observing two successive oppositions. It was discovered by John Kepler (1571-1630) that the periodic times of the different planets are connected with their respective distances from the sun, and this relationship he expressed in his third law. [KEPLER'S LAWS.] The fact that the planets move in ellipses under the attraction of the sun makes such a relationship a mathematical necessity, but Kepler found it out by actual comparison of numbers, the mathematics of the subject remaining undiscovered till the time of Sir Isaac Newton (1642-1727).

Periophthalmus, a genus of small fishes allied to the Gobies, with a few species from the shores of the Indo-Pacific ocean. Their ventral and pectoral fins enable them to move pretty freely over mud-banks, which they frequent at low tide to hunt for small shell-fish, and their extremely prominent and mobile eyes are suited for vision in air as well as in water.

Periostitis, inflammation of the fibrous membrane which covers the surface of bones, excepting where there is cartilage. The chronic form is usually the result of injury and commonly occurs therefore in the bones that are most exposed to damage, such as the shin, collar-bone, skull, and ribs. A very tender and painful hard swelling forms at the seat of injury. The acute form is met with generally as the result of rheumatism, scrofula, or syphilitic taint; or it may follow neglect of lengthened exposure to wet and cold on the part of those thus hereditarily disposed to bone weakness. The affected bone grows extremely tender and fever sets in. Matter sometimes forms beneath the membrane, separating it from the bone and cutting off the supply of blood to the latter. The bone will probably die, and an abscess be formed with the dead bone lying in it. In these circumstances even blood-poisoning is not infrequent.

Peripatetic, of or belonging to the school or system of philosophy founded by Aristotle (384-322 B.C.), whose custom it often was, it is said, to teach while walking to and fro in the *peripatos*, or covered walk, at the Lyceum in Athens. Hence it gradually came also to be applied in a general sense to anyone who walked about or wandered from place to place in connection with some calling or trade, as a peripatetic (or itinerant) photographer.

Peripatus is the genus which is the only member of the remarkable class known as the Prototracheata or Onychophora. It is certainly one of the most interesting and abnormal animals in the whole range of the Invertebrates. It has a soft worm-like body, with a series of rudely-jointed limbs placed at equal distances along the body. The antennæ consist of a single pair; they are blunt and composed of a series of ring-like segments. The first two pairs of limbs are modified to help in feeding; the first pair acts as the jaws and are enclosed in a mouth cavity, while the second pair is represented by two papillæ, at the ends of which the slime glands discharge mucus. Breathing is effected by a series of internal respiratory tubes which ramify throughout the body. The functional body cavity is a "pseudocœle" [BODY CAVITY], while the true body cavity or coelome is represented only by a number of small vesicles in the bases of the legs. The interest of the genus—apart from some questions of the nature of the body cavity and the course of development—is that, while it is worm-like in appearance and in the character of its nephridia or kidneys, it is more closely allied to the Myriapoda. There are numerous species which are very widely scattered, occurring in the West Indies, South and Central America, the Cape of Good Hope, Australia, and New Zealand. The animals live under leaves and stones or in decayed wood.

Periplaneta, the cockroach. [BLATTA.]

Perischoechinoidea, the principal of the four orders which form the extinct group of Palæochinoidea. It is divided into two families, the Melonitidæ and the Archæocidaridæ; the former is almost, if not entirely, restricted to America. The main character of the order is that the interambulacral plates consist of more than two rows.

Perisperm, the nutritive tissue of the seed which originates from the tercine, or nucellus, outside the embryo-sac. It consists mainly of thin-walled parenchymatous cells rich in starch or oil, and, together with the endosperm within the embryo-sac, constitutes what was formerly known as albumen. With the exception of some Alismaceæ and Orchidaceæ, almost all spermatophytes have perisperm in the early stages of the development of the seed; but in "exalbuminous" seeds it, together with the endosperm, is absorbed before the seed is ripe.

Perissodactyla, a section of Ungulata, containing those animals in which the number of toes on the hind feet is odd. There are only three living

families—the Rhinoceroses, the Horses, and the Tapirs. These last, and some of the Rhinoceroses, however, have four digits on the fore limb. The section containing Hoofed animals with toes of even number is called Artiodactyla, and includes the Ruminants and the extinct Anoplotherium (with two toes), and the Swine and Hippopotamus (with four toes).

Peristalsis, the involuntary muscular movement of the alimentary canal and other hollow organs of the body, whereby its contents are propelled onwards. Peristaltic movement is best exemplified in the small intestines, in which it consists of rhythmic circular contractions travelling downwards like waves, in consequence of the successive contraction with corresponding expansion of the circular and longitudinal muscular fibres. Peristalsis is continuous throughout the whole canal, from the gullet to the anus. It is found also in the ureter, Fallopian tubes, etc.

Peristome and Peristomium, two terms much used in descriptive zoology and liable to be confused. The former is the area around the mouth, as in Sea-urchins, Sea-anemones, etc.; and the latter is the whole segment in which the mouth opens in worms, as in the earthworm.

Peritoneum, the closed serous sac which enfolds the abdominal organs. The visceral layer of the peritoneum is reflected over, and forms the outer covering of the several abdominal viscera; this layer is continuous with the parietal layer of the peritoneum which underlies the external abdominal wall, and between the two layers is enclosed what is known as the cavity of the peritoneum. The folds of peritoneum which are reflected over the intestines and serve to attach them to the back part of the abdomen, enclose certain blood-vessels and nerves, forming the structure which is called mesentery. Other connecting folds of the peritoneum are attached to other abdominal organs, and form the outer covering of the ligaments of these organs. A peculiar fold of peritoneum, which is spread over a portion of the intestines like an apron, is called the great omentum.

Peritonitis is inflammation of the peritoneum. The chief symptoms of this disease are intense pain, tenderness of the abdomen on pressure, and some degree of fever; there is often vomiting, and the bowels are generally confined; the abdomen may become distended either from effusion of fluid into the peritoneal cavity, or from inflation of the intestines by the accumulation of gas; the pulse may be frequent and small; and in fatal cases the patient rapidly falls into a state of extreme collapse. Peritonitis may be due to exposure to cold, to extension of inflammation from adjoining structures, or to injury. Perforative peritonitis is the condition which obtains when there is a breach of continuity of the wall of one of the abdominal viscera (usually as the result of ulceration) with extravasation of its contents into the peritoneal cavity. Peritonitis also occurs as a result of tubercular and cancerous deposit, and in connection with pyæmia.

In every condition of peritonitis immediate medical attendance is imperatively called for.

Periwinkle, the popular name of the genus *Vinca*, two species of which, doubtfully indigenous, are the only British representatives of the Apocynaceæ, a considerable tropical order of Gamopetalæ. They are prostrate perennial evergreen herbs, with wiry stems; opposite, ovate, leathery leaves; and salver-shaped, blue, white, or red flowers, an inch or more across. There are five petals; the corolla-tube is hairy inside, and has five included epipetalous stamens; and there are two superior many-seeded carpels and a single style. There is a poisonous milky latex. The periwinkle grows rapidly and is excellently adapted for rockery and also for concealing ugly bits and corners.

Periwinkle, a genus of marine Gasteropoda. More than forty species occur on the sea shore throughout the world. The commonest (*Littorina littorea*) is familiarly known as the "winkle." It has a compact, solid, turbinate shell of few whorls; the spire is short, the aperture nearly circular, without any siphonal channel; the outer lip is simple and sharp-edged. The horny operculum fits it closely. It inhabits the lowest zone of seaweed between tidal limits. It feeds on seaweed and has been utilised to prevent beds of young oysters from being smothered by the shiny green weed that grows so abundantly, in hot weather especially. Boiled in their shells and extracted with a pin, periwinkles—which are nothing but sea snails—are eaten with relish by those who "toss their heads and screw their faces" at the French for eating garden snails. During the winter the periwinkle is largely consumed by thrushes in the Hebrides. It was the contemporary of prehistoric man, for shells have been found in caves and tombs in such a state as to show that they were even at that remote epoch strung together for purposes of personal decoration. Incidentally they thus prove that vanity is almost as old as the human race.

Perjury is a crime committed when a lawful oath is administered on some judicial proceeding to a person who swears wilfully, absolutely, and falsely in a matter material to the issue or point in question; and under various modern statutes offences of the like sort against veracity, although committed when the witness is not on oath, are rendered indictable and punishable as perjury—*e.g.*, in the case of statutory declarations substituted for oaths. Perjury and subornation of perjury are both misdemeanours and punishable by fine and imprisonment.

Perkin, SIR WILLIAM HENRY, chemist, was born in London on March 12th, 1838, and was educated at the City of London School. He studied chemistry at the Royal College of Chemistry in Oxford Street, London, under Dr. A. W. Hoffmann, whose assistant he became. Research was his hobby and, in attempting to produce quinine artificially, his experiments led him to discover aniline blue or mauve (1856) and he at once undertook its production commercially, thereby founding the coal-tar colours industry. In 1869 he began to manufacture

artificial alizarin, the red dye of the madder root, and till 1874 he was actively engaged in kindred pursuits. After this date he returned to his early passion and devoted himself to scientific research in pure chemistry, which eventuated in valuable discoveries. As the discoverer of a method of preparing coumarin, the odoriferous principle of the Tonka bean, he obtained the first natural perfume ever produced in the laboratory and thus established the artificial perfume industry. At a meeting on February 26th, 1906, held at the Mansion House and presided over by the Lord Mayor of London, it was determined to commemorate the jubilee of the foundation of the mauve dye industry by presenting Dr. Perkin with his bust, and the Chemical Society with his bust, and by organising a Perkin Research Fund. A jubilee celebration took place at the Royal Institution, London, on July 26th, 1906, a few days after a knighthood had been conferred upon him. In 1879 he received from the Royal Society, of which he was a Fellow, the Royal medal for his investigations in coal-tar colours and, in 1889, the Davy medal for his inquiries into the relations between chemical constitution and the rotation of the plane of polarisation in a magnetic field. Sir William Perkin died at Sudbury, near Harrow, on July 14th, 1907.

Perm., a government in the east of Russia, mostly in Europe, but partly in Asia. It occupies an area of 128,211 square miles. It is traversed from north to south by the Ural mountains, the highest points of which within the limits of the province exceed 5,000 feet. The principal rivers are the Petchora; the Tobol and its tributaries the Issot, Sosva, Tura and Ui; and the Kama with its affluents the Kolva, Sylva, Tchušovaya and Vogulka. The rivers are valuable in that they take the place of roads in many districts, while timber is floated down several of the streams. Though agriculture is carried on in most parts, the crops—chiefly oats, wheat, barley and potatoes—are inadequate for the wants of the population. Cattle-breeding, especially among the Bashkirs in the south-east, is extremely active, the herds of horses being exceptionally large. Bee-keeping is general. The mineral wealth comprises iron, copper, gold, platinum, coal, asbestos, salt, iron chromates and sulphates, and is being steadily, if slowly, developed. The manufactures include flour, spirits, leather, oils, candles, paper, matches, soap, textiles, glass and pottery. Pop. (estimated), 3,300,000. The capital, Perm, on the Kama, 250 miles E.S.E. of Vyatka, has an estimated pop. of 51,000, engaged in the ship-building yards, tanneries, chemical works, roperies, the arsenal and cannon-foundry.

Permanent Way, the finished road-bed of a railway, including bridges, switches, crossings, and viaducts, as distinguished from the temporary track laid down by the contractor during the construction of the line for the removal of soil and rock in cuttings and for the conveyance of materials.

Permanent White consists of the sulphate of barium, an insoluble heavy white powder. It is largely employed as a pigment, possessing the

advantages over the ordinary white lead of greater permanence and a less poisonous nature.

Permiaks, a Finnish people of North-east Russia. They are first mentioned as Beormas by King Alfred (*Orosius*, i. 14), in whose time they dwelt on the shores of the White Sea, and are referred to under the name of Perm in the chronicles of the 10th century. They call themselves Kami-mort—i.e., the "people of the Kama river," in which basin they are now chiefly centred. They constitute with the Votyaks and Ziryanians the Permian division of the Finnish family, and still greatly resemble the Baltic Finns both in speech and type; light or chestnut hair, grey or blue eyes, and a florid complexion being very common as in Finland. Although converted to Christianity by St. Stephen towards the close of the 14th century, they still retain many of the old Shaman superstitions, and firmly believe that the forests are everywhere inhabited by demons living in communities like their own. The Permiaks have always been hunters and fishers, though many have in recent times formed agricultural settlements on the model of the Russian *mir* ("commune"), and with these the tendency is to become rapidly absorbed in the general Russian population.

Permian System, so named (1841) by Sir Roderick Murchison (1792–1871) from the province of Perm in Russia where it occupies an area twice the size of France. It rests upon the Carboniferous system, conformably in Bohemia, unconformably in England. In Germany, where it is well developed, it is called Dyas, from having two main divisions. It varies considerably in the mineral character and relative thickness of its different members, but is mainly a great series of red sandstones, sometimes containing brecciated conglomerates, and magnesian limestone. Its chief outcrop in England is a narrow band extending due north and south from the neighbourhood of Nottingham, east of the Derbyshire and Yorkshire and of the Newcastle coal-fields, along which line the magnesian limestone presents a scarped edge to the west. The subdivisions of the system in England and Germany are:—

ENGLAND.	GERMANY.
St. Bees Sandstone, with gypsum.	Bunter-Schiefer (variegated shales).
Magnesian Limestone.	Zechstein (mine-stone).
Marl-Slate.	Kupfer-Schiefer (copper-slates).
Penrith or Lower Red Sandstone, with brockrams.	Rothtoddligende (red dead—i.e., non-metalliferous—layers).

The lower red sandstone is 3,000 feet thick near Penrith in Cumberland, but only 250 feet in the east of England. It contains beds of breccia known as *brockrams*, containing large ice-scratched stones derived from the older rocks of the Welsh mountains. The marl-slate is a thin bed of brown shale, chiefly seen in Durham, representing the bituminous copper-bearing bed of the Harz Mountains. The magnesian limestone, 600 feet thick, occurs chiefly in the eastern area, where it has yielded the building-stone for York Minster and the Houses of Parliament. The St. Bees sandstone, 600 feet

thick in Cumberland, is not nearly so thick in the east, where it passes conformably up into the Trias. Fossils are few in the Permian, but are Palaeozoic in type, the plants belonging mainly to Carboniferous genera, as also do the brachiopods. The polyzoan *Fenestella retiformis*, the brachiopod *Productus horridus*, the fishes *Platysomus* and *Paleoniscus*, and the lizard *Proterosaurs*, in the marl-slate, are characteristic. Labyrinthodont footprints occur in the Penrith sandstone, near Dumfries. Permian conditions have been compared to those of the Caspian Sea at present, many species being dwarfed as if by unsuitable surroundings, such as cold or intensely saline waters.

Permutations and Combinations, in algebra, are terms applied to the different arrangements or groups which can be made by taking some or all of a number of things. In a combination we have only to consider the number of things chosen, but in a permutation note is also taken of the order in which the things are arranged. Thus the number of combinations of two letters which can be made from the letters $a b c d$ is six, the combinations being ab, ac, ad, bc, bd, cd ; but the number of permutations which can be made from the same letters, also taken two at a time, is twelve, for if the order of the letters in the above be reversed we have different permutations: ab and ba are the same combination, but different permutations. The fundamental problems in this branch of algebra are to find the number of permutations or of combinations which can be made from n different things taken r at a time. To find the number of permutations, we first take one of the different things. This we can do in n ways. We have, therefore, $n-1$ things left behind, and so we can choose our second thing in $n-1$ ways; but anything in the first choice can be associated with anything in the second, so altogether we can take two things in $n \times (n-1)$ ways. Having taken out two, we have $n-2$ things left for the third choice, and therefore we can form $n \times (n-1) \times (n-2)$ permutations of the n things three at a time. It is to be noticed that the number of factors which the expression contains is the same as the number of things taken at a time. Hence the number of permutations of n things taken r at a time will be $n(n-1)(n-2)(n-3) \dots$ to r factors, which is $n(n-1)(n-2)(n-3) \dots (n-r+1)$. If the n things are taken all at a time, the number of permutations is $n(n-1)(n-2) \dots 1$. This expression is often written $n!$, and is read "factorial n ," meaning the product of all the numbers from n down to 1. From the above, it follows that the number of combinations of n things taken r at a time is $\frac{n(n-1)(n-2) \dots (n-r+1)}{r!}$, for every

combination of r things gives rise to $r!$ permutations. If it be required to find the number of ways in which a party of five people can be chosen out of ten, we have clearly a case of combinations, since the party will be the same in whatever order we take the people, and the required number of ways is $\frac{10 \cdot 9 \cdot 8 \cdot 7 \cdot 6}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} = 252$. But if we want to know

in how many ways four people can arrange themselves in eight chairs, we are dealing with permutations, and the number of ways is

$$8 \times 7 \times 6 \times 5 = 1,680.$$

The theory of probability or chance is connected with the theory of combinations.

Pernambuco, a maritime state of Brazil, South America, bounded on the N. by Parahyba and Ceara, on the E. by the Atlantic, on the S. by Alagoas, and on the W. by Piahy and Bahia. It occupies an area of 49,625 square miles, still largely composed of virgin forest. Much of the surface is mountainous, and the principal rivers are the Capabaribe and Ipojuca. Sugar, coffee and tobacco are grown in the fertile coastal land, cotton is cultivated in the interior, where, too, livestock is reared. Other products include timber, dye-woods, hides, drugs, gold and gems. The capital is Pernambuco or Recife. Pop. (estimated), 1,200,000.

Pernambuco, capital of the foregoing state, on the Atlantic coast of Brazil, South America, at the mouths of the Capabaribe and Biberibe. It consists of three parts:—(1) Recife, so called from a reef which runs parallel to the coast, is situated at the south extremity of a sandy peninsula, with the sea on the east and Biberibe on the west, is the chief business quarter, and contains the custom-house, bourse, etc. (2) United to Recife by bridges is São Antonio upon an island of the same name, between the afore-mentioned peninsula and the mainland. This section is distinguished by broad streets and fine houses, and contains the palaces of the president and the bishop, a theatre, arsenal, hospital, etc. A bridge leads from this to (3) Boa Vista, which is the residence of most of the European inhabitants. Trams unite the city and suburbs. A harbour, with fort and lighthouse, is formed by the natural basin within the reef, and the trade of the town is extensive. The chief exports are cotton, sugar, hides, spirits, dye-woods, rubber, and cacao; and the imports, cotton and linen goods and hardware, half the trade being with Great Britain. The manufactures comprise cotton, machinery, glass and leather. Founded in the 16th century by the Portuguese, and passing for a time into the possession of the Dutch, Pernambuco is the nearest to Europe of the great ports of South America, and is sometimes called the Venice of America in consequence of its numerous water-ways. Pop. (estimated), 190,000.

Perpendicular. 1. In *Architecture*, a style of Gothic which prevailed in England in the 15th and 16th centuries, and was contemporary with the French Flamboyant style, though not possessing its characteristic ornamentation. It is pointed Gothic, and its chief feature is the prevalence of straight vertical lines. Its windows had vertical mullions and horizontal transoms, and are noted for their large size. Other features are vaulted roofs with fan tracery, such as may be seen in King's College Chapel, Cambridge; open timber

roofs, such as that of Westminster Hall; and paneling, such as may be seen in some of the colleges of Oxford and Cambridge, and in some of the English cathedrals.

2. In *Geometry*, one line is said to be perpendicular to another when it makes equal angles with the other on both sides. A line is perpendicular to a plane when it makes a right angle with two lines in that plane, and in this case it can be proved that it is also at right angles to every line in the plane. Two planes are perpendicular to each other when any line in one plane perpendicular to their line of intersection is at right angles to the other plane. The word perpendicular is sometimes popularly used to mean vertical.

Perpetual Motion does not mean something which is for ever moving, but is a term applied to any machine or contrivance which will go on moving without any external motive power, or will do work in excess of the energy supplied to it. It is, in fact, a creator of energy, and from the very earliest times has absorbed a vast amount of attention from real and sham philosophers. Though equally ancient, this problem has scarcely the respectability of the search for the Philosopher's Stone, and has certainly been less fruitful in its results. The chief addition to science which its search has produced is the denial of itself. The law of the conservation of energy, which experience has proved, can, in fact, be stated in the form that perpetual motion is impossible. Since it was invariably the custom of perpetual motors to stand still when called upon to carry out the designs of their inventors, scientists doubted from very early times the possibility of their existence. So great a nuisance did these self-imagined creators become that in 1775 the Parisian Academy of Science refused to receive any more descriptions of their schemes, and lamented the fact that many good workmen were lost by thus developing into misguided enthusiasts. Many examples of perpetual motion were worked by means of balls which alternately became nearer the inside or outside of a wheel. The balls on the outside were to overbalance those on the inside and so turn the wheel, this happy result being brought about by means of curved spokes or pivoted levers. Something of this sort was exhibited by Edward Somerset, 2nd Marquis of Worcester (1601-67), in the Tower of London before Charles I., about 1639. The wheel of Orffyreus was reported to have been moving for eight weeks in a locked room of a castle belonging to the Landgrave of Hesse Cassel. Its works were, however, concealed, and Orffyreus destroyed their hidden portion because the mathematician Grasse (1688-1742)—who had at first been induced to believe in it—became rather curious as to its construction. Water-wheels were also—on account of their utility—the subject of much deliberation, and many a one was constructed (on paper) which considerably pumped up the water for its own use, sometimes embellished by a water-screw, but as often without. One form of perpetual motion was founded on the hydrostatic paradox: A B is a large vessel of water, B C is a narrow tube leading from

its base and bent round at the top; the weight of water in A B should naturally (!) overbalance that in B C, and so water would be sent up to C, where it would drop back into the tank and go on for ever. The simplicity of this design would recommend it to all but for the trifling circumstance that it does not work. Magnetism, being little understood, was naturally invoked to act the part of creator of energy. A steel ball, B, on an inclined plane, P H, was attracted upwards by the magnet M, but reaching the hole H it fell through, rolled back to P, and again started on its upward path, continuing the cycle for ever—in the mind of its inventor. Such instances of time ingeniously wasted are of historical interest but, it is needless to add, possess no practical value whatever. The more modern development is that of a gas-engine which drives a dynamo machine; this generates electricity which decomposes water, and this decomposition heats the gas-engine. A simple application of the laws of dynamics and the dynamical theory of heat at once shows the impossibility of this circular and efficient combination.

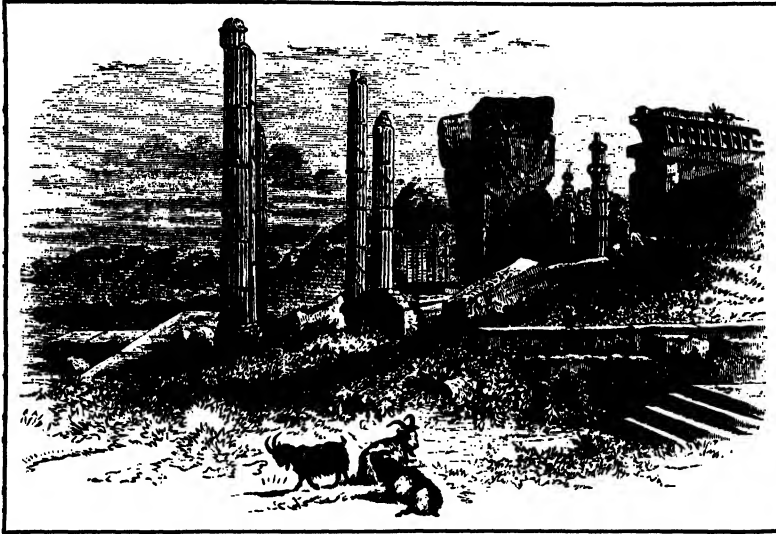
Perpetuity ("unlimited duration"). The rule against perpetuities, or the doctrine of remoteness, applies to the corpus of property, real or personal, and whether limited by deed or will; it lays down that the vesting of property cannot be postponed or the alienation of it restricted beyond a life or any number of lives in being, and twenty-one years from the death of the surviving life. The principal exceptions to the rule are estates tail, charitable dispositions, and grants of property to particular families for public service.

Perpignan, capital of the department Pyrénées Orientales, France, on the right bank of the Tet, 81 miles S.W. of Montpellier, and 8 miles from the Mediterranean. It is an important fortress, as guarding the entrance into Spain, and has high walls and a commanding citadel, enclosing the old castle of the counts of Roussillon, a territory now represented by the department. Some of the public buildings date from the period of Spanish rule, the chief of them being the 14th-century cathedral of St. Jean, the bourse, hôtel-de-ville, palais de justice, the college, the museum and municipal library (the last two housed in the building of the former university). The principal manufactures are broadcloth and woollen stuffs, playing cards, candles, leather, paper, and chocolate; and there is a considerable trade in brandy, wine (for which the department is reputed), cork, honey, wool, etc. Olives and fruit are extensively cultivated. For three centuries Perpignan belonged to Aragon, but Louis XI. of France occupied it as security for money lent to the King of Aragon, to whom the town was restored by Charles VIII. Francis I. besieged it in 1542 without avail, but, disgusted with the brutality of their Spanish governor, the inhabitants surrendered the town to Louis XIII. Though the citadel held out for a time it capitulated on September 9th, 1642, the town being afterwards ceded to France by the treaty of the Pyrenees. Pop. (1901), 36,157.

Perrault, CHARLES, writer of fairy tales, was born in Paris on January 12th, 1628, was educated at the college of Beauvais, and called to the Bar in 1651. His great ability soon procured him an important official post, which enabled him to carry out his literary projects. In 1671 he was admitted a member of the Academy, and was instrumental in effecting several reforms in that institution. His earliest writings were slight poems and burlesques, but between 1688 and 1698 his *Parallèle des Anciens et des Modernes* appeared in four volumes, and aroused great discussion. Perrault endeavoured to show that the ancients were inferior to the moderns in everything—arts, letters, science, philosophy, and even cookery. He found many

contains about 7 per cent. of alcohol and keeps well. The beverage made from apples is cider.

Persecutions. Opinions obnoxious to the party in power, from the time of the Israelites in Egypt to the persecution of the Jews in Russia in the 20th century, have always had to face the consequences of being held by the minority. Suffering is the badge of all the tribe in all ages and in all countries. But when religion is complicated by political questions mankind finds intolerance hard to eradicate. Hence the ten great persecutions of ecclesiastical history are only a partial enumeration of martyrdoms endured for fidelity to conscience. These ten, promoted some-



BURIAL-PLACE OF KINGS : PERSEPOLIS (p. 360).

adherents, and his work was the beginning of a lengthy battle between partisans of the ancients and moderns; but this and all his other writings sink into insignificance beside his delightful fairy tales, *Les Histoires et Contes du temps passé avec les Moralités*, which was published in 1697 under his son's name, and proved a revelation to Europe. They have never lost their charm, and Perrault ranks high among those who have given delight to childhood by their works. He died in Paris on May 16th, 1703.

Ferry, a beverage, agreeable but alcoholic, derived from the fermentation of the juice of pears. The best kind of pears are invariably used for superior qualities, but mixed fruit is employed for ordinary perry. Scrupulous cleanness in the process is essential, since the metal-work of the machinery is readily acted on by the juice. The manufacture is chiefly carried on in Worcestershire, Gloucestershire, Herefordshire, Devonshire and Somerset in England and in Normandy and Brittany in France. Ferry

times by the best Roman emperors, were—under Nero, who setting fire to Rome threw the odium on the Christians and they were sacrificed, Tacitus writes, "not so much out of regard to the public good as to gratify the cruelty of one man," A.D. 64-68; under Domitian, 95; Trajan, 104-117; Hadrian, 125; Marcus Aurelius, 161-180; Septimus Severus, 200-211; Maximinus, 235; Decius, 250; Valerianus, 257-260; and Diocletian, 303-313, in which the English proto-martyr Alban fell. The blood of the martyrs, as Tertullian said, proved the seed of the Church. Suffering made the Christians more zealous, though respite only came with the conversion of Constantine. But later centuries saw Christians turned persecutors. Thousands of Albigenes and Waldenses perished during the 13th century. During the Inquisition in Spain in 236 years Llorente estimates 32,000 persons were put to death and 291,000 were subjected to other punishments. On St. Bartholomew's day, August 24th, 1572, there died in France 70,000 Huguenots. The persecutions of Catholics by Protestants and of

Protestants by Catholics as each party became dominant during the reigns of Henry VIII., Mary and Elizabeth, are too well authenticated. The sufferings of Christians in Japan and of the Covenanters during the 17th century; the persecutions in the Netherlands; the rigorous measures directed against the Quakers by the Puritans in the American Colonies, and the massacres in Cochinchina and in Annam in 1845, are only a few leading items out of the black catalogue. The persecution of Protestants by Protestants seems an anomaly. Calvin's burning of Servetus in 1553, however, and the fifty-eight death-sentences for which he was responsible in the days of his ascendancy constitute a striking example of how slowly mankind learns toleration.

Persephone. [PROSERPINA.]

Persepolis, the capital of ancient Persia, situated in a fertile plain watered by the Bendemir (ancient Araxes), 33 miles N.E. of Shiraz and 210 miles S.S.E. of Ispahan. Founded by Cyrus or Cambyses, it became not only the capital of the kingdom but also the burial-place of the kings, besides containing the royal treasury. It was surrounded by three granite walls of sixteen, forty-eight, and sixty feet respectively, and had brazen gates. Alexander the Great conquered it in 331 B.C., and the town, with the exception of the palace and treasury, was pillaged. Alexander is said himself to have set fire to it. In the Middle Ages the kings resided here. Among the existing remains are the Chehel Minar (forty columns), part of a marble building put together without mortar, a fluted column fifty feet high, and a palace hewn in the marble. The entrance is guarded by composite animals nineteen feet high, and there are fine bas-reliefs of ceremonies, processions, etc.

Perseus, a hero of Greek fable, was the son of Jupiter and Danae. Polydectes, King of Seriphus, having designs on Danae, induced Perseus to bring him the head of the Gorgon Medusa, hoping that he would perish in the exploit and so be out of his way. The Gorgons were three hags who had only one eye and one tooth amongst them, which they used in turns. Led by Mercury and Minerva, Perseus visited the Gorgons' abode and stole the eye and tooth, which he refused to restore until they had taken him to the Nymphs, who gave him winged sandals, a wallet, and the cap of invisibility. Having put on these things, he found the Gorgons asleep and cut off the head of Medusa with a scimitar, while he gazed upon her image in his brazen shield lest he should be turned into stone by looking at the head itself. Putting the head in his wallet he fled. On the return journey he delivered Andromeda from the sea-monster which was about to consume her and then married her. Arrived at Seriphus he saved his mother from the persecution of Polydectes by turning him and his court to stone by exhibiting the Gorgon's head. The island, too, and even the very frogs were also turned to stone. Perseus afterwards gave Medusa's head to Minerva, who placed it on her shield. Inadvertently killing his grandfather at the games of Larissa, he ex-

changed his kingdom of Argos for that of Tiryns, where he founded Midea and Mycenæ, and became the ancestor of the Persides and therefore of Hercules.

Perseus, the last king of Macedonia, born about 220 B.C., was the eldest son of Philip V. When quite a boy he was appointed to the command of an expedition sent to guard Pelagonia against the Illyrians. He treacherously compassed the death of his brother, whom he suspected of designs on the throne. He ascended the throne in 179, when his father died, and endeavoured to strengthen his position by conciliating the people and connecting himself with neighbouring potentates; but his avarice and ambition embroiled him with the Romans, who defeated him after a struggle of three years' duration. He was banished to Alba in 167, dying there within five years from that date. The Roman historians speak very unfavourably of him.

Pershore (formerly also called PERSEBE and PEARSCORE), a town of Worcestershire, England, on the Avon, 9 miles S.E. of Worcester. It was famous as the seat of an abbey founded in 689 by Ethelbert, King of Mercia, which had become Benedictine by 984. It was repeatedly injured by fire and tempest and all that remains is part of the church of the Holy Cross. The nave has perished, but there are still extant the Early English choir, two lateral chapels, and the fine central tower erected in 1331. St. Andrew's church, originally erected by Edward the Confessor, was rebuilt and dedicated by Simon, Bishop of Worcester, in 1147. Both churches have undergone restoration. Fruit-growing and market-gardening are the staple industries, but there are also manufactures of agricultural implements and stockings. Pop. (1901), over 3,000.

Persia, a kingdom of western Asia lying between Turkey in Asia, the Caspian, the Russian Trans-Caspian territory, Afghanistan, the Arabian Sea, and the Persian Gulf. Its area is estimated at 628,000 square miles.

Physical Features. Modern Persia occupies the western and larger half of the so-called Iranian plateau rising between the valleys of the Indus and the Tigris. It is a section or southern spur of that great dividing range which forms the backbone of the Euro-Asiatic continent. On the west the highlands of Armenia unite the Iranian plateau with the mountains of Asia Minor, and on the east the Paropamisus and the Hindu Kush connect it with the Himalaya and Pamir highlands, whence radiate most of the chief Asiatic ranges. The average height of the plateau may be about 4,000 feet above sea-level, varying from 8,000 or higher in some of the outer regions to not more than 500 in the most depressed portions of the centre. The plateau is thus basin-shaped, less than half of its surface draining outwards towards the Caspian and the ocean. The most mountainous parts of the country are the provinces of Azerbaijan, Mazandaran, Ghilan, Kurdistan, Luristan, and Fars. From the south of the first-named province the

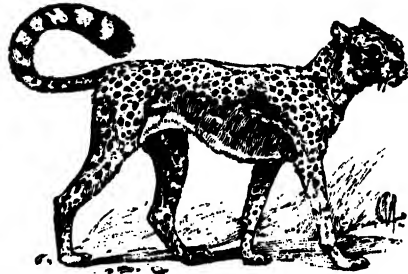
Elburz range runs south-east and then north-east, roughly parallel to the Caspian coast, Demavend, some forty miles north-east of Teheran, being 18,000 feet high. On reaching Astrabad the range sinks to lower elevations which eventually join the Paropamisus. In the north-east of Persia a hilly region, bounded by the Daman-i-koh or Kopet Dag, marks the descent to the plains of Trans-Caspia. Lastly there stretches from Azerbaijan, in a uniformly south-easterly direction, a broad belt of parallel ranges, which traverse the whole extent of the country down to the Strait of Ormuz and the Arabian Sea. Speaking generally, Persia may be termed a riverless country, for, excepting the Karun, which was open to foreign navigation in 1888, it cannot boast of one single navigable or even great stream. The lakes include Urmia in the west; Daria-i-Nemek, south of Teheran; Gavk-haneh, south-east of Ispahan, and Tashk and Niriz near Persepolis.

Geology and Mineralogy. Knowledge of the geology of Persia is in a most fragmentary state. Recent formations are frequent, and the whole of the great plains, covering at least half the surface of the country, consist either of a fine, pale-coloured alluvial loam, or of gravel fine or coarse, forming usually a long gentle slope from the surrounding hills to the alluvial flat. There is much geological variety in the mountains, but a few formations prevail over large areas. The Zagros chain from Mount Ararat to Shiraz consists apparently of Cretaceous (hippuritic) and Tertiary formations. In North-West Persia there appears to be a greater development of Mesozoic and Palaeozoic formations. Metamorphic rocks (granite) and volcanic outbursts (notably Demavend) are found over considerable areas. Copper, lead, iron, manganese, zinc, nickel, cobalt, alum, coal, turquoise, antimony, salt, and even gold occur in deposits of greater or less richness, but mainly owing to the absence of cheap transport and the apathy of the people, the mineral resources of Persia are developed spasmodically, sporadically, and always with characteristic deliberation.

Fauna and Flora. The forests of the Elburz abound with wild animals, as wolves, tigers, jackals, boars, buffaloes, foxes, and the cheetah. Hunting with the cheetah was at one time the sport of the nobles. The animal was conveyed hooded to the hunting-ground until the prey was marked. The hood was then removed, and the cheetah ran its victim down with incredible speed. Leopards and wild hogs are found in Mazandaran; jerboas in Fars; antelopes are hunted in many parts, and the wild ass all over the country. Among domestic animals the horse, mule, camel, ass, and ox are the most important. The horses, though neither so swift nor so beautiful as those of Arabia, are larger, more powerful, and better adapted for cavalry. The Turkoman breed of horses is famed for endurance, while some of the Arab breed introduced into Dashtiskan rival those of Nejd. The mules are small, but capable of enduring great fatigue; they require, however, almost twice as much food as a horse.

Climate. Persia has an extraordinarily varied climate. In the southern parts, especially the tracts adjoining the Persian Gulf, the summer heat is very great, and the climate is similar to that of Arabia, while the same may be said of some parts of the interior. The town and district of Shiraz and the rest of Fars and the plateau enjoy a fine climate, while the soil there is in general rich and productive. Proceeding northwards to Irak the climate continues to improve, and Ispahan is most pleasantly situated in this respect. Still farther north the extremes of heat and cold become more pronounced, and Teheran, the capital, is not deemed salubrious. The north-western provinces, Gililan and Azerbaijan, are excessively cold in winter, while the Caspian tracts are characterised by much rain and general unhealthiness. The great eastern province of Khorassan has within itself every variety of climate, and the tracts adjoining Seistan are intensely and dangerously hot, but nevertheless on the whole Khorassan is not insalubrious.

Products. Persia is rich in undeveloped resources. Grain (mainly wheat and barley) is grown throughout the country, and is plentiful in some provinces, while rice is largely raised along the low-lying tracts of the Caspian littoral. Peas, beans, lentils, maize, and millet are universally cultivated, while



CHEETAH.

a wide variety of fruit is grown, most of it being dried for export. Sugar and beetroot are grown; but the latter, though plentiful, is not manufactured so as to undersell the imported article. Cotton, silk, and tobacco are raised, and opium is an important and increasing source of revenue. The southern shores of the Caspian and the rivers which flow into that sea are richly stocked with fish, principally sturgeon and sterlet. Skins and hides are exported largely, as well as an increasing quantity of sheep's wool and goat's hair for shawls. Carpets are an ancient and famous production, the best containing from 10,000 to 40,000 stitches to the square foot. Shawls are largely exported to Turkey, those made in Kerman being scarcely inferior to Cashmere shawls. Woollens and cottons, though manufactured, are not exported, and most of the silks are kept for home use. Rose water is made principally for India and Java.

Language and Literature. The ancient idioms or forms of Persian (which belongs to the great

class of the Indo-European languages) are:—(1) Zend, which died out in the 3rd century B.C.: its alphabet is of Semitic origin, and the writing runs from right to left; (2) ancient Persian, found in cuneiform inscriptions on the rocks of Behistun, etc.; (3) Pehlevi, and (4) Pazend. The transition from ancient to modern Persian is formed by the Parsee, or Farsi, in use from A.D. 700 to 1100. The purest dialect now spoken is said to be found in Shiraz, Ispahan, and the neighbourhood. The literature may be said to date from the 9th Christian century. The best-known writers are Omar Khayyam, whose epigrammatic quatrains through the genius of Edward Fitzgerald have also a high place in English literature; Firdusi, author of the *Shah-Nameh*; Nizami, founder of the romantic epos; Farid-ed-din Attar, the renowned author of *Iqnd Nameh* ("Book of Counsel"); Jelal-ed-din Rumi, whose poem on *Contemplative Life* made him the oracle of Oriental mysticism; while Sâdi and Hafiz may be said to have marked the zenith of Persian poetry. Able historians arose at an early period: Rashid-ed-din (1247-1320) wrote a summary of all Mohammedan countries and times; Sherif-ed-din was the chronicler of Tamerlane and his times. After these a simpler and less affected school of writers arose. Mirkhond, the author of a *Universal History*, and Khondemir, stand prominently in this category. Most of the standard works of science are in Arabic.

Education. In every town, city and village in Persia there is some sort of school, though in the small villages it is really little more than a class, held by a mullah in the parish mosque. The fees are very low, amounting to from 7d. to 1s. 9d. per month for each child. Above these, in the larger towns, are *madrasahs*, or religious colleges, frequented by candidates for the three learned professions—the church, law, and medicine. There is a state-supported Royal College at Teheran, conducted on European lines, and smaller ones at Tabriz and Ispahan.

Trade. Persia exports a number of articles, among which opium, raw silk, rice, cotton, tobacco, carpets, asafoetida, dried fruits and grain figure most conspicuously. The import trade is eagerly competed for by both Russia and Great Britain, the former having, in the north, north-west, and south-east, an ascendancy which is balanced by British predominance in the south. The imports naturally lead off with British calico prints, white and grey shirtings, next to which come silks, satins, woollens, sugar, cloth, and spices. The principal trade routes are numerous—viz., from Trebizond and Tiflis to Tabriz, and from Astara, on the Caspian, and Alexandretta to Tabriz; from Resht and Ser-i-Meshed to Teheran; Gez to Astrabad, Ashkabad to Meshed, Meshed to Khiva and Bokhara, Meshed to Afghanistan, India to Persia (*via* Afghanistan), the Bander Abbas - Kerman - Yezd - Meshed line, the Lingah - Laristan line, the route from Bushire to Shiraz and Ispahan, the Mohammedrah - Shushter-Burujird line, the route from Baghdad to Kermanshah, and the Baghdad and Persian Kurdistan line. There is much traffic on the Caspian.

Government. The Shah of Persia is one of the most absolute monarchs in the world, and his powers are believed to have been the same from the earliest ages, without further restraint than regard for religion, desire of reputation, and a fear of exciting dangerous opposition. He is nominally assisted by a Council of State of about thirty members, the more prominent of whom are ministers with portfolios. From time to time it is reported (even so lately as 1906) that the Shah intends to convene a representative Assembly, with himself as President, to be elected by the mullahs, merchants and landowners. The system of making presents (*mudakkil* or *pushkesh*) is universal; and all offices, from the highest to the lowest, are bought and sold, the result being, as might be inferred, a most corrupt administration. The law is twofold—Shar or ecclesiastical, administered by a court of lay priests, doctors of the law, etc., under the Sheikh-el-Islam; and the Urf or common law, administered by the civil magistrates throughout the kingdom. More important criminal cases come before the provincial governor, the ultimate appeal being to the king. The civil court, *divan-khaneh*, is dreaded on account of its expense and uncertainty, and arbitration is preferred.

Finance. The main source of revenue is the land-tax, the principle being that one-fifth or 20 per cent. of the agricultural produce is the right of the king. In practice the taxes are farmed out by the government, and the allocation in separate areas is left to the decision of local authorities. Besides this there are a herd-tax of from one-third of a kran (a kran being a silver coin = 4.80d.) to ten krans for each beast, a trade-tax, and the custom dues, which again, in each province, district or town, are farmed out to the highest bidder. Upon foreign merchandise *ad valorem* duty is charged at the port of entry or departure in accordance with the treaties, but more is often levied in the interior. Besides these taxes and dues, an irregular revenue or *sursat*, to meet exigencies, is forcibly requisitioned, under the disguise of gifts, from the grandees and officials, but it is always the poor who really pay. The sums received by the king as fines, presents, bribes, confiscations, and gratuities are also very considerable; and the amount of hoarded bullion, secretly amassed in the royal treasury, is said to be three or four million sterling.

Population. The population is estimated at 9 to 9½ millions, which, while the country is nearly three times as large as France and five times less populous, will reveal the sparseness of the population.

History. The *Shah-Nameh* of Firdusi is the authority for the early history of Persia. It embodied the national legends, which laid the cradle of the race in the mountains around Ararat, where dwelt Shem's descendants, who peopled Media—the modern Azerbaijan. Here arose the first Persian or Median dynasty, the Paishdadian. On these annals the Greek writers and cuneiform inscriptions form parallel commentaries. Kai-Kobad, of the ensuing Kaianian dynasty, is believed to be the Deioces of Greek writers. He founded in

Azerbaijan one of the two cities called Ecbatana, and he and his son figure in some of the achievements of the hero Rustam. About 537 the Persians rebelled against and conquered the Medes, and established a mighty empire under Kai-Khusrû, or Cyrus, stretching from Asia Minor to the Indus and from Mesopotamia to the Oxus. A later monarch, Gushtasp, the Darius Hystaspes of Greek writers, built the famous palace of Persepolis, and made two fruitless attempts to subdue the Greeks, though he did succeed in adding Thrace and Macedonia to his empire. His son Xerxes (Isfandiâr) was one of the first to embrace the faith of Zoroaster. He too menaced Greek independence, but was effectually checked at Salamis and Plataea. The greatness of the Kaianian dynasty was now on the wane, and the empire itself was being weakened by intestine dissensions. Darab II., the Darius Codomanus of the Greeks, was compelled to yield his throne to Alexander the Great, whose magnificent empire on his death in 324 was split up into fragments—Persia, with Syria, falling to the Seleucids. The latter, however, soon lost Bakh, or Bactria, and about 246 a chieftain named Arsaces threw off the Greek yoke and established the Parthian Empire, to which Bactria was annexed. For five centuries in all, Persia groaned under the tyranny of the Greeks and Parthians, till Ardeshir (Artaxerxes) founded the Sassanian dynasty. These kings raised Persia to a height of power and prosperity which it had never attained before. Shapur I., son of Ardeshir, defeated the Romans under their emperor Valerian, whom he took prisoner, and his grandson, Shapur II., also fought against them; but the power of the Arabs, wrought up to fanaticism by their new faith, was beginning to arise, the religion of Zoroaster was overthrown, and after the battle of Nahavend (A.D. 639) the Sassanians gave way to the Arab rulers or Khalifates. At first Persia was regarded as an outlying dependency, but with the Abbaside dynasty (750) Baghdad became their capital and Khorassan their favourite province; but in the 13th century the Khalifate and its minor governments sunk beneath the devastating arms of Genghis Khan. The Mongol dynasty, erected by him on the ruins of the Khalifate, was supplanted by the Ilkhanis in 1419, but Timur the Tatar restored the glories of Iran and established a wide dominion. The era of the Sufawi dynasty which followed is marked by the reigns of Shah Ismail and of Abbas the Great, the latter a powerful monarch, who defeated the Uzbeks and Turks, and allied himself with the British, Spanish, Dutch, and French Governments. In the reign of Sultan Husain the wild Afghans arose, invaded Persia, and captured Isfahan (1722), and since then the two countries have been not infrequently embroiled one with another. Nadir Shah's invasion of India in 1738 is another conspicuous event in the history of Persia. Adventurous attempts were made at this time by two Englishmen, Elton and Hanway, to open up trade with Persia. The Zend dynasty, which followed on the death of Nadir, was rendered famous by the wise administration of Karim Khan. Fath Ali Shah, the nephew of the eunuch-king, who was the

first of the present Kajar dynasty, was crowned at Teheran in 1798; but was eventually dragged into hostilities with Russia, and had to surrender Derbend and several districts on the Kur. War with Russia was resumed at the instigation of France, and in 1813 the treaty of Gulistan, followed by a fresh war and the treaty of Turkmanchai in 1828, stripped Persia of Armenia and the territories to the north, conceded to Russia the sole right of navigation on the Caspian, and inflicted a crushing war indemnity on Persia, besides other humiliations. In 1834 Fath Ali Shah died, and Muhammad Shah, son of Abbas Mirza, the Crown Prince, succeeded to the throne. An attempt on the new king's part to re-establish his rule over Herat was forcibly resisted by Great Britain, which sent a small force to Karak and caused the Shah to retreat. Nasr-ed-Din succeeded on the death of his father in 1848. In spite of an agreement entered into with Colonel Sheil, the Persian Government again embarked on aggressive measures against Herat. Great Britain again protested, and after a very brief expeditionary campaign, in which Sir James Outram at Bushire and in Khuzistan carried all before him, a treaty of peace was signed at Paris in 1857. Since then Persia has abstained from interference with the "key to India," but her frontier disputes with Baluchistan resulted in a boundary commission, under Sir F. Goldsmid, in 1872. The north-eastern frontier was settled by treaty with Russia in 1881 which, in conjunction with the Russian subjection of the Turkomans, established a welcome peace along the frontier. Nasr-ed-Din was assassinated in 1896 and was succeeded by Muzaffer-ed-Din, who died on January 8th, 1907, and his son Ali Mirza reigned in his stead.

Ethnology. From its situation Persia has for ages been a converging-point or else a highway of migrations for Aryans, Semites, and Turanians (Mongolo-Tatars), that is, for all the stock races of Asia and Europe. Throughout the historic period the land has been occupied by two distinct social classes—the settled populations of the towns and cultivable districts, engaged in agriculture, trade, and the industries; and the unsettled populations of the steppes and highlands, engaged in pastoral pursuits, intertribal warfare and pillage. Owing to the physical diversities of soil and relief, these two classes, representing, as it were, the two principles of good and evil in the old Zoroastrian religion, have never amalgamated into a homogeneous Persian nationality. Each group differs from its neighbours in usages, often even in language; and the only bond of union is their common Moslem religion, nearly all the Persian peoples having been Mohammedans of the Shi'ah sect since the 7th century. The great bulk of the people belong to the settled class, and these are for the most part Persians proper, more or less mixed descendants of the old Iranian race of Aryan speech, founders of the Persian monarchy, and originators of all the arts and general culture recognised as distinctly Persian. The nomad class comprises three separate groups:—(1) Iranian Aryans akin to the Persians, including the Baluchi in the south and south-east; the Kurds, with the kindred Bakhtiari, Lurs, Faili and others, in the

western and northern uplands (Luristan, Persian Kurdistan, Khorassan). (2) The Arab Semites, chiefly in the south-western provinces of Fars and Khuzistan. (3) The so-called Turanians, that is, the Turkoman, Turki and Mongolian tribes, such as the Kajars; the Afshars, a former royal tribe; the Goklans, Yomuds, Kizil-Bashi, Taenuri, Aimaks, and others scattered over the northern provinces; some now Parsiwan, *i.e.*, of Persian speech; some still speaking Turki dialects, though generally familiar with Persian. This idiom, current not only throughout Persia, but also in many parts of Afghanistan, Baluchistan and Turkistan, and long the court and diplomatic language of India, is one



PERSIANS.

of the most refined and highly cultivated tongues in the world, with a continuous literature extending over nearly 1,000 years, rich especially in poetic works of great excellence—epic, narrative, lyric, and mystic. The Neo-Persian is a direct descendant of the old Iranic branch of the Aryan linguistic family, with greatly simplified grammatical forms, but somewhat overcharged with Arabic elements due to the Mohammedan influence.

Persian Gulf, THE, separates Persia from Arabia, and communicates with the Indian Ocean by the Strait of Ormuz, which is 35 miles wide. The Gulf has a length of 650 miles, with an average width of 180 miles, and receives the Euphrates as well as some small rivers from Persia. It contains many islands, among them being Kishm, Ormuz, and Bahrein on the Arabian coast. On the Persian coast is the harbour of Bushire, and there are pearl fisheries on the western coast.

Persigny, JEAN GILBERT VICTOR, DUC DE, statesman, was born at St. Germain l'Espinasse, department of Loire, France, on January 11th, 1808. His real name was Fialin, which he afterwards exchanged for that of Persigny. Being expelled from the army in 1833 for insubordination he took to journalism, but on his introduction to Louis Napoleon engaged in a Bonapartist crusade throughout France. He was mixed up in the affair of Strasburg (1836) and was captured at Boulogne (1840) and sentenced to 20 years' imprisonment. His detention, however, was not very serious, and left him ample time for literary work. On the outbreak of the Revolution in 1848 he hastened to Paris and was instrumental in engineering the election of the Prince-President. He played a leading part in the *coup d'état* (1851), and succeeded de Morny as Minister of the Interior in 1852. In the same year he married a grand-daughter of Marshal Ney and was created Comte. From 1855 to 1858 and in 1859-60 he was French ambassador at the Court of St. James's. He was again Minister of the Interior from 1860 to June, 1863, when he retired from office. In September of the latter year, he was created Duc de Persigny and sat in the Senate until the *débâcle* following the catastrophe at Sedan. He then fled to England, but died in Nice on January 14th, 1872.

Persimmon, the Virginian date-plum (*Diospyros virginiana*), a tree belonging to the ebony tribe, the round orange-like fruit of which, though astringent when green, becomes edible when "bletted" or affected by frost. The fruit is fermented into a beer and distilled for spirit in the Southern States. The bark has febrifugal properties. The tree is common in the south of the United States, and attains a height of 60 feet. Its hard, fine wood is used in turnery, especially for shuttles. The wood of the chapote, or persimmon of Mexico and Texas, is used in America as a substitute for box, but the black fruit of this tree is sweet and insipid.

Persius, otherwise AULIUS PERSIUS FLACCUS, Roman satirist, was born at Volaterræ, in Etruria in A.D. 34, and educated there and at Rome. He became the pupil and devoted friend of Cornutus the Stoic, and was acquainted with Seneca, Lucan, and other notable Romans. His works consist of six short satires, considered much inferior to those of Horace and Juvenal, but still possessing much vigour and directness. They were enthusiastically received by the *literati* of the time, and were cited with admiration by subsequent scholars. With remarkable courage he denounced the lax morals that were already deteriorating the old Roman standard of virtue. Persius died near the Appian Way in 62, after a brief, blameless and beautiful life. His satires have been often translated into English, Dryden's version being probably the best.

Personal Equation, or PERSONAL ERROR, is the error which any personal observer is found to make in his observations of the heavens, quite irrespective of the errors of the instrument. The

time when a star crosses the meridian has to be most accurately noted; to do this the astronomer writes down the hour and minutes from the clock when the star enters the field of view of the transit instrument. He then counts the beats from one particular second, estimating to the tenth of a second when the star crosses each line. This is written down each time, or a revolving cylinder is connected with the pendulum of a clock, and at every second the pendulum breaks an electric circuit and causes a dot to be made on the cylinder. The observer, on seeing the star crossing each line, presses a button which breaks a circuit and also causes the production of a dot. This enables the time to be measured very nearly; but it is found that some observers are late and others premature in their observations, and so it is customary to allow for this. One well-tried observer is, as it were, taken as the zero, and the observations of all the others are reduced to what they would be if he had made them. It is found that anyone's personal error remains constant over an interval of several months; hence when a comparison has once been made between any one and the standard observer the corrections are quite simple. Personal error, of course, comes into play in every sort of measurement, and the less trained the person the greater is the error, but it is practically only in astronomy that allowance is made for it.

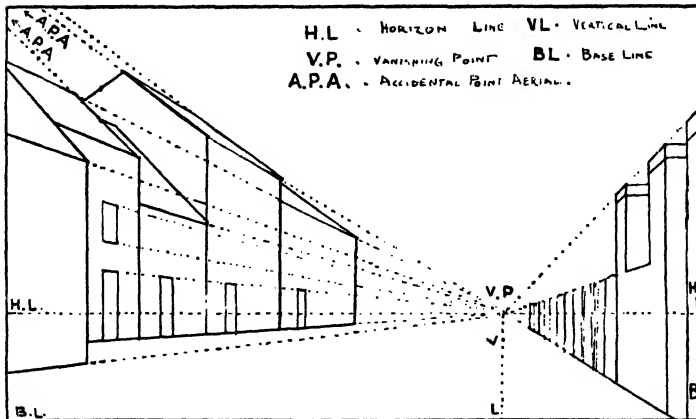
Personalty signifies generally any personal property in contradistinction to reality, which signifies real property. It consists of money, jewels, furniture, investments in funds, things that are personal and movable: realty consists of freehold land and the rights therewith connected.

Perspective, the art of showing in a drawing on a flat surface the relative position and magnitude of objects in nature as affected by distance

to draw nearer to one another and eventually to meet as they disappear in the distance. The point at which they appear to meet is termed the vanishing point (V.P., Fig. 1). All lines running from the spectator towards the centre of the picture meet at the same vanishing point. Other sets of lines which do not run towards the centre have other vanishing points, often right out of the picture.

Before beginning a drawing it is necessary to rule three lines on the plan:—(a) The base or ground line (B.L., Fig. 1), which forms the actual base of the picture. (b) The horizontal line (H.L., Fig. 1) represents the apparent horizon and is on a level with the eye of the spectator; in a general way this line cuts the paper at about one-third of the distance above the base line, but if the scene to be drawn be viewed from a height the horizon line would come near the top of the picture. (c) The vertical line (V.L., Fig. 1) is drawn perpendicular to the ground and horizon lines meeting the latter in the point of sight. This point of sight is the centre of the picture but not necessarily in the centre of the paper. All lines which run from the spectator towards the centre of the picture meet in the point of sight. Vertical lines in a picture are always drawn vertically and all lines which are parallel to the ground line remain parallel and do not vanish.

Points of distance are two points in the horizon on either side of the point of sight. These points form the vanishing points of all lines cutting or appearing to cut the ground line at an angle of 45° . There are other parallel lines with different positions and different directions and consequently these have different vanishing points called accidental points. If the accidental point is above the horizon line, as in the case of certain lines of roofs, it is called the accidental point aerial (A.P.A., Fig. 1); if it be situated below the horizon line it is



PERSPECTIVE—FIG. 1.

and atmosphere, and as seen from one point of view. Everyone must have noticed that the lines of a railway, which of course are parallel, appear

called the accidental point terrestrial; though neither of these points may fall within the scope of the picture. Aerial perspective expresses the

different states of distinctness and brightness of colour of objects as affected by light, atmosphere, and their position and distance above the ground.

The foregoing elementary considerations will be most usefully realised by studying them in connection with the accompanying figures by which they are illustrated. Fig. 2 represents the sketch of a landscape and Fig. 1 shows the same subject diagrammatically treated on the lines of the science of the perspective involved. In fact, Fig. 1 may be regarded as a skeleton, and Fig. 2 as the same skeleton clothed.

Perspective was known to the ancients, being probably an invention of Greek mathematicians.

public library and the museum of the Perth Literary and Antiquarian Society; the General Prison for Scotland, erected in 1812 for prisoners of war; the Royal Infirmary; the Sandeman Public Library; Perth Academy; James VI.'s Hospital, built in 1569 for poor and infirm persons and orphans, but now converted into artisans' dwellings, the pensioners being boarded out, and the Perthshire Natural History Museum, second to none in Scotland. Perth has long been famous for its dye-works and other industries include the making of ink, gauge-glasses, linen, jute, woollens, beer, whisky, flour and biscuits, besides iron-founding, roperies and ship-yards. The river is tidal, but vessels exceeding



PERSPECTIVE—FIG. 2.

It fell into disuse during the Italian disturbances, but was revived by Albrecht Dürer, whose rules for the practice of the art were extended and completed by Peruzzi and Ubaldi in 1600. In the 17th century it was further developed by Desargues and in 1715 and 1719 by Dr. Brook-Taylor, who was the first Englishman to treat perspective as a serious science.

Perth, the capital of Perthshire, Scotland, on the Tay, 22 miles S.W. of Dundee. Owing to its picturesque situation and the proximity of the nicely-wooded Kinnoull Hill (730 feet) and Moncreiffe Hill (725 feet), with a distant view of the Grampians away to the north, and the noble sweep of the river, bordered on the right bank by the beautiful meadows of the North and South Inch, it well merits its appellation of the Fair City. It has, however, been considered that the inhabitants have not done all they might to beautify and adorn a town towards which Nature has been so gracious. The public buildings include the ancient church of St. John the Baptist, which now contains three churches, and which in the past has witnessed many moving incidents; St. Ninian's Episcopal Cathedral; the Municipal Buildings in the Tudor style; the County Buildings in the Grecian; the City Hall; the Marshall Memorial, housing the

200 or 300 tons must tranship at Newport or Dundee. The stream is crossed by several bridges of which the fine nine-arched structure designed by John Smeaton (1772) is noteworthy, and communicates with the suburb of Bridgend, where John Ruskin spent much of his boyhood. The chief magistrate is one of the five in Scotland entitled to the designation of Lord Provost. The city, formerly called St. Johnstown, is rich in historical associations. Constituted a royal burgh in 1210, it was taken by Edward I., in 1298 and, till 1482, ranked as the Scottish capital, although Edinburgh became the seat of government in 1437. The clans Chattan and Kay (Quhele) fought their celebrated combat on the North Inch in 1396; James I. was murdered in the Dominican Monastery in 1437, when Catherine Douglas behaved so heroically; John Knox preached in St. John's the rousing sermon that led, intentionally or not, to riots and the destruction of property in 1559; Gowrie House was associated with the mysterious kidnapping of James VI. in 1600, an episode usually described as the Gowrie Conspiracy; Cromwell captured the town in 1651, and the Jacobites occupied it in 1715 and 1745. The Stewart cause found the townsfolk more or less apathetic, although the adhesion of the 4th Earl of Perth (titular Duke of Perth) caused this title to be forfeit in 1695 until it was

restored in 1853. The Five Articles of Perth, passed by the General Assembly convoked at Perth in 1618 by order of James VI., enjoined kneeling at the Lord's Supper, the observance of Christmas, Good Friday, Easter and Pentecost, Confirmation, the private administration of baptism and the Lord's Supper. These things were anathema to the Presbyterians, who at last induced the General Assembly of Glasgow to pronounce that of Perth illegal with the consequence that the objectionable Articles were null and void. Sir Walter Scott's *Fair Maid of Perth* graphically sets forth many of the most romantic and most dramatic events in the city's story. Pop. (1901), 32,872.

Perth, capital of the state of West Australia, picturesquely situated on the Swan River, 12 miles above Fremantle, its port. Its streets are well laid out, the houses being built chiefly of brick and stone. It is the seat of an Anglican and a Roman Catholic bishop. The principal buildings are the two cathedrals, the town hall, the mechanics' institute, the governor's palace, the Victoria Public Library (erected to commemorate Queen Victoria's Jubilee in 1887), the Scots College, the Mint, and the Observatory. The Perth Park is a magnificent reserve of more than 1,000 acres, and the river where the town stands expands into a sheet of almost lake-like proportions. It is a commercial rather than an industrial centre, being the head-

quarters of the State banking and railway business. Pop. (1901), 36,274.

1828, two tragedies called *Fridigonde* and *Persto*, and then a comedy, *Le Grand Homme chez Lui*. Afterwards he turned to political and sociological questions, on which he wrote several interesting books. About 1840 he was attracted to the study of anthropology, especially the branches dealing with prehistoric man and the Stone Age. In 1839-41 appeared his work *De la Création* and, in 1847, *Antiquités celtiques et antédiluviennes*. His investigations were completed at a later date by the publication of *De l'Homme antédiluvien* (1860), *Nègre ou blanc, de qui sommes-nous fils?* (1861), and *De la Génération spontanée* (1862). In 1863 his discovery of a fossil jaw-bone in the quarries of Moulin-Quignon, near Abbeville, which he claimed to belong to man of the Deluge epoch, excited a keen controversy. He supported his views in *De la Mâchoire de Moulin-Quignon* (1865) and *Des Outils de Pierre* (1865). He presented his collection of antiquities to the nation and they were placed in the museum at St. Germain-en-Laye. He died at Abbeville, in the department of Somme, in 1868.

Perthes, FRIEDRICH CHRISTOPH, bookseller, was born at Rudolstadt, Germany, on April 21st, 1772. He served his apprenticeship in Leipzig, the headquarters of the book trade, and in 1796 began business on his own account in Hamburg, and twenty-six years later settled at Gotha, where



VIEW OF PERTH, SCOTLAND, FROM THE GARDENS OF THE SANATORIUM.

quarters of the State banking and railway business. Pop. (1901), 36,274.

Perthes, BOUCHER DE CRÈVECŒUR DE, anthropologist, was born at Rethel in the department of Ardennes, France, in 1788. He published, about

he died on May 18th, 1843. He possessed great influence in the literary world, and published many remarkable works.

Perthes, JOHANN GEORG JUSTUS, bookseller, uncle of the preceding, was born at Rudolstadt,

Germany, on September 11th, 1749, and died at Gotha on May 2nd, 1816. He established a publishing business at Gotha, the prosperity of which his son, WILHELM (born at Gotha, June 18th, 1793; died, September 10th, 1853), greatly enhanced by making the publication of geographical works, including Stieler's *Atlas*, a speciality. He made a distinct "hit" with the *Almanach de Gotha*, first issued in 1816 and still an indispensable year-book. His son, BERNARD WILHELM (born, July 3rd, 1821; died, October 27th, 1857), maintained the high character of his house by the periodical issue of *Mittheilungen aus Justus Perthes geographischer Anstalt* which, under the editorship of August Petermann (1822-78), attained a world-wide reputation.

Perthshire, a central and the fourth largest county in Scotland, bounded on the N.W. and N. by Inverness-shire, on the N.E. by Aberdeenshire, on the E. by Forfarshire, and on the S.E. by Fifeshire and Kinross-shire, on the S. by Clackmannanshire and Stirlingshire, on the S.W. by Stirlingshire and Dumbartonshire, and on the W. by Argyllshire. It occupies an area of 2,528 square miles, comprising some of the loveliest and most romantic scenery in the British Isles. The Highland line, running in a south-westerly direction from Stonehaven in Kincardineshire to the town of Dumbarton and largely occupied by the great fertile valley of Strathmore, roughly divides the Highlands from the Lowlands. The mountains are numerous and important. In the northern and north-western area are the Grampians, with many detached hills of which the highest are Ben Lawers (4,004 feet), Ben More (3,843), Ben-y-Gloe (3,671), Schiehallion (3,547), Ben Dearg (3,304), Ben Vorlich (3,224), Ben Tulachan (3,099), Ben Chonzie (3,048), Ben Ledi (2,875), Ben Vrackie (2,757), Farragon (2,559), and Ben Venue (2,393); in the south-east are the Sidlaws and Ochils. The chief rivers are the Tay (with its tributaries, on the left, the Lyon, Tummel, and Isla and, on the right, the Bran and Almond), the Earn, the Garry, the Allan, the Teith and the Forth, the last serving as the boundary with Stirlingshire during most of its course. Some of the lochs present features of exquisite beauty, the principal being Loch Tay, Loch Earn, Loch Erich (partly belonging to Inverness), Loch Rannoch, Loch Tummel, Loch Vail, Lake of Menteith, Loch Ard and the renowned trio of Lochs Katrine, Achray and Vennachar which Sir Walter Scott immortalised in *The Lady of the Lake*. The scenery of the Passes of Killiecrankie, Leny and the Trossachs almost beggars description. The waterfalls include those of the Bruar (the subject of a touching poem by Robert Burns), the Tummel, the Moness, the Bran and Bracklinn. Of many glens the more picturesque are Glen Almond, Glen Devon, Glen Farg, Glen Artney, Glen Ogle, Glen Dochart, Glen Falloch, Glen Lochay, Glen Lyon, Glen Garry and Glen Tilt. Strathmore, Strathearn, Strathallan, Strathfillan, the Carse of Stirling and the Carse of Gowrie are valleys as fair as they are fertile. The most desolate tracts are Flanders Moss in the extreme south and the Moor of Rannoch in the north-west.

Agriculture is the prevailing industry, the hilly districts being given over to sheep and cattle, the rich land of the valleys and level area being mostly under wheat, oats, barley and potatoes. Perthshire is the sportsman's paradise. Besides deer forests the moors abound with grouse, pheasant, partridge, woodcock, ptarmigan, and capercaillie and the rivers and lakes with trout, while the Tay is noted for its salmon. Outside of Perth city (the capital of the county) the manufactures are not very considerable. Weaving is carried on in some of the smaller towns and villages; there are textile mills at Rattray, Stanley and Doune; fruit-growing flourishes in certain localities, and granite, marble and sandstone are quarried. Crieff, Comrie, Callander, Pitlochry and Dunblane are well-known health resorts, and Pitcaithly near Bridge of Earn is esteemed for its mineral waters. Of many celebrated mansions the most remarkable are Taymouth, Blair Castle and Dunkeld Palace. Of old the shire consisted of the districts of Athole in the north, Rannoch in the north-west, Breadalbane in the west, Balquhider in the south-west, Menteith in the south, Perth in the south-east, Gowrie in the east and Stormont and Strathearn in the centre. Historically the most interesting features are the Roman camp at Ardoch (the most perfect example in the United Kingdom); Scone (pronounced *Scoon*), where the Scots kings were crowned between 1153 and 1488 and Charles II. in 1651, and whence the Stone of Destiny was removed by Edward I. to Westminster Abbey; the defeat of Macbeth at Dunsinane (1056), and the battles of Tippermuir (1644), Killiecrankie (1689), Dunkeld (1689), and Sheriffmuir (1715), in addition to the stirring events of which Perth was so often the scene. Pop. (1901), 123,262.

Pertinax, PUBLIUS HELVIUS, a Roman soldier who rose from centurion to emperor, was the son of a charcoal-burner, and was born either at Alba Pompeia, in Liguria, or at Villa Martis, among the Apennines, in A.D. 126. He became successively senator, commander of the legion which routed the barbarians who were threatening to overrun Italy, consul-elect, governor of Syria, chief of the commissariat of Rome, and proconsul of Africa and, on the death of Commodus the tyrant, who had favoured him, reached the throne (December 31st, 192). Conspiracies, however, soon sapped his position and, some reforms proposed by him proving very unwelcome to the soldiers, he was assassinated after a reign of eighty-six days.

Perturbations, in astronomy, are irregularities in the simple motion of one heavenly body about another, caused either by the action of other bodies or by irregularities in the shape or density of the primary body. The subject of perturbations has been specially studied with reference to the moon. [LUNAR THEORY.] This investigation was begun by Sir Isaac Newton, who devised the method known as the variation of parameters for its treatment. A perturbed body does not move in a true ellipse or in any simple curve, but it may be considered to have an elliptical orbit whose axes are slowly changing in length and direction while its

forms and positions in space are constantly being altered by the disturbing influence of other bodies. In the case of the moon the sun's attraction is the chief element of disturbance, but the planets have some effect as well, and these perturbations introduce enormous difficulties in the calculation of her path. The planets influence each other's motions, and it was by noticing the perturbations of Uranus, and finding the direction in which some disturbing body must lie, that John Couch Adams and Urbain Jean Joseph Leverrier were led to the discovery of the planet Neptune.

Peru, a republic of South America, bounded on the N. by Ecuador, on the E. by Brazil and Bolivia, on the S. by Chile, and on the W. by the Pacific. It occupies an area of about 695,000 square miles. The country consists of three regions, namely, the dry coastal region, some 20 miles wide; the Andean region, comprising the Maritime, Central and Eastern Cordilleras, in parallel ranges running gently from north-west to south-east; and the Montana region in the north-east. Among the lofty peaks is the almost extinct volcano of Arequipa, or Misti (19,200 feet high). The two ranges of the Andes enclose the Sierra plateau, which is the most populous part of the country, and has a diversified surface culminating in the towns of Pasco (14,000 feet) and Cuzco (11,380 feet). Beyond the Sierra is a forest region in which dwell many tribes of wild Indians. The chief river, the Marañon, one of the two main headwaters of the Amazon, with its tributaries the Huallaga and Ucayali (the other main head of the Amazon), has a course of 500 miles, 100 miles of which are through a narrow defile, and 200 miles through a fertile upland valley, till it quits Peru. On it are rapids seven miles long. The great Sierra plateau is rich in metals. In the river valleys quinoa, sugar, grain, and fruit are cultivated. The lakes are unimportant, although the largest, Titicaca, partly in Peru, partly in Bolivia, is the highest in the world (12,500 feet), while on the plateau of Pasco are two lakes, in one of which the Marañon rises. Lima, with its port Callao, is the capital, other important towns being Arequipa, Cuzco, Puno, and Truxillo. Much of the country is of volcanic formation, and there are large deposits of salt, nitre, and nitrate of soda, especially in the parts ceded to Chile after the disastrous war of 1879-83. Gold abounds in the neighbourhood of Truxillo and Lima, and much is found and washed secretly by the Indians. Silver is still more abundant, especially in the Cerro de Pasco. It is computed that since the time of the first occupation by the Spaniards, silver to the value of nearly £300,000,000 has been extracted. Quick-silver (at Huancavelica), copper, iron, and lead are found, but difficulty of carriage is an obstacle to the successful working of them. Maize, wheat, cinchona, coca, the vine, tobacco, sugar, cotton, and fruits are cultivated, and among the exports are gold and silver, cinchona, guano, nitre, alpaca, chinchilla skins, hides, and straw hats, while manufactured goods are imported. The fauna includes the puma, jaguar, llama, alpaca, vicuña, viscacha, chinchilla, monkeys, snakes, coatí, tapir, and the

condor and many other birds. The climate of Peru has a great range. On the coast there is neither rain nor cloud, but the wet seasons send down much water from the uplands, and from this arise thick mists, while the cool currents from the sea and from the Andes temper the atmosphere, the temperature at Lima ranging from 60° to 82° F. In the western rainless districts oranges and other fruits abound near the rivers, tropical plants in the mist-laden regions, and in the Sierra (which is said to be the home of the potato), besides ample pasturage, cereals are cultivated. The eastern area is tempered by moist equatorial winds and rain, the upper districts being clothed with forest, and the lower fertile valleys enjoying a delightful climate. Peru has often suffered from earthquakes. The constitution is modelled on that of the United States. Both army and navy are small; the former totalling 4,000 men; the latter comprising 5 vessels (1910). The population is half Indian—the Quichuas in the north; the Aymara in the south. The rest are creoles, mestizoes (half-castes), and Chinese coolies. The Quichuas speak the Peruvian language proper, which, together with the dialects of the Aymaras, represents the language of the Incas, when Peru had attained a high degree of civilisation. In 1532 Pizarro conquered the Inca Atahualpa, and Spain ruled till the struggle for independence (1821-4). In 1836 Peru and Bolivia united, to separate again in 1839, since which time there have been frequent tumults. In 1879 Peru and Bolivia united against Chile, and were utterly worsted in 1883, Peru having to cede Tarapaca permanently and Tacna and Arica temporarily to Chile. There have been several boundary disputes of recent years. Those with Bolivia and Brazil were adjusted in 1909, and the King of Spain has still (1910) to give his decision as Arbitrator on boundary questions now pending between Peru, Colombia, and Ecuador. The population is about 4,500,000.

Perugia, capital of the Italian province of the same name, situated on a hill above the Tiber, 90 miles N. of Rome. It has lofty walls and a citadel and is well built. Among the chief buildings are the 15th-century cathedral of San Lorenzo (with a fine library of MSS.), the churches of St. Agnese (with Perugino's frescoes), St. Bernardino (with façade of marble and terra-cotta), St. Pietro (with marble pillars from an ancient temple and some valuable paintings), the Bourse (with frescoes by Perugino), the Palazzo Pubblico and the University, and there remains an Arch of Augustus, put together without cement. The manufactures include silks, woollens, liqueurs and candles. Perugia, the ancient Perusia, was one of the twelve republican cities of Etruria, but submitted to Rome in 310 B.C. It was pillaged by the Goths in the 6th century and restored to the Eastern empire by Narses in 552. Perugia was the centre of the Umbrian school of painting. Pop. (1901), 61,385. The PROVINCE contains 3,750 square miles, is traversed in parts by spurs of the Apennines, and watered by the Tiber and its tributaries. It produces corn, wine, oil, fruits and silk. Pop. (1901), 675,352.

Perugino, otherwise PIETRO VANNUCCI, painter, was born at Città della Pieve, near Perugia, Italy, in 1446, and was a fellow-student with Leonardo da Vinci at Florence about 1475. He produced many fine frescoes for Italian churches, but some of his earliest have perished, and perhaps the oldest examples of his work in existence are those in the Sistine Chapel at Rome begun by him about 1480. During his next stay in Florence (1486-99) he taught Raphael and he was also fined in the criminal court for an assault on a humble citizen (1487). His practice greatly increased and being fond of money he amassed a fortune. Of his most famous pictures the "Pietà" in the Pitti Gallery in Florence belongs to 1495, and the "Madonna and Saints" was executed for the Certosa near Pavia. He decorated the Cambio or Exchange in Perugia with a series of frescoes and contributed the Stanza del Incendio to the adornment of the Vatican in Rome. He died at Fontignano, near Perugia, in 1524.

Peruvian Bark, the name still retained in the British Trade Returns for the bark of the cinchona, from which quinine is prepared, though but a small part of that imported into the United Kingdom now comes from Peru or even from South America. Cinchona is a genus of evergreen tree belonging to the order Rubiaceæ, including thirty-six species, about a dozen of which are utilised. They are natives of the Andes, between 10° N. and 22° S., growing mostly between 5,000 and 8,000 feet above the sea-level. In 1638 the Countess of Chinchon, wife of the governor of Peru, was cured of a fever by this bark, and it was afterwards known as Jesuits' bark, because its use was disseminated throughout Europe by the Society of Jesus. In 1860, under the superintendence of Sir (then Mr.) Clements Markham, plants were taken from Peru to the Neilgherry Hills, and Sir Robert Christison showed that sulphate of quinia is as abundant in the bark of young shoots as in that of older stems, so that the trees are now treated like osiers. Indian bark first came into the British market in 1867, but the chief imports now proceed mostly from Ceylon and Madras, and in increasing quantities from Java. In the 18th century the crude "bark" was largely and successfully administered as a febrifuge, but now the crystalline alkaloids, especially quinine, quinidine, cinchonine, and cinchonidine, are extracted, and can be far more accurately dispensed. The chief species cultivated are *C. officinalis* (yielding pale cinchona), Crown or Loxa bark, *C. Calisaya*, and its variety *Ledgeriana* (yielding yellow cinchona or Calisaya bark), and *C. succirubra*, yielding red cinchona bark.

Pesaro, a seaport and capital of the province of Pesaro e Urbino, Italy, 19 miles N.E. of Urbino, on the Foglia at its mouth in the Adriatic Sea. The chief buildings include the cathedral of the Annunciation, the prefecture (originally the palace of the Sforzas), the Rocca Costanza (a castle built in 1474 by Costanzo Sforza and now used as a prison), the Technical Institute, and the Museum, one of the features of which is a collection of

majolica, for the manufacture of which Pesaro was once noted. The industries comprise silk-weaving, tanning, iron-founding, pottery and glass. It is also famous for its figs. Rossini, the composer, was a native. During the Middle Ages, first the Malatesta family, then the Sforzas and afterwards the Dukes of Urbino were the ruling powers until 1631, when it reverted to the States of the Church. Pop. (1901), 25,115.

Peshawar, or PESHAWUR, a town, military station, and capital of the North-West Frontier Province, India, on a plain near the Barn, 12 miles E. of the Khyber Pass, on the direct route from Kabul to India, and so possessing an important trade. It is commanded by the fort of Bala Hissar on the north-west, and two miles west of the town are the cantonments and principal civil offices. There are some fine mosques and English buildings, and around the town are pleasure grounds and gardens. Peshawar is a commercial centre and its industries (mostly manufactures of cutlery and scarves) are inconsiderable. Pop. (1901), 95,147. The DISTRICT OF PESHAWAR has an area of 2,444 square miles and a pop. (1901) of 786,406; the DIVISION OF PESHAWAR, comprising the districts of Hazara, Kohat and Peshawar, has an area of 8,206 square miles and a pop. (1901) of 1,715,248.

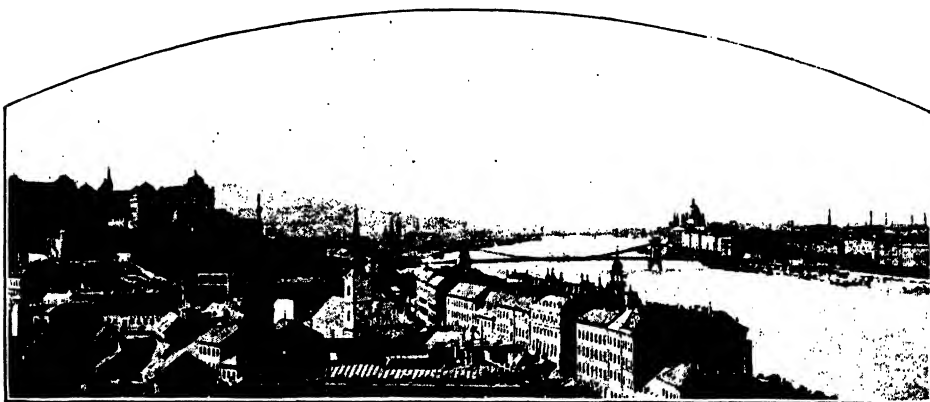
Pessimism, in a general sense, is the habit of looking at the black side of things, and is exactly opposed to that optimism which finds everything good in this best of worlds. Many religions strike a distinctly pessimistic note—for instance, the Buddhist, which looks on the world of matter as distinctly evil—and some perverted forms of Christianity are not free from this reproach. In philosophy the tendency was organised into an elaborate system by Arthur Schopenhauer.

Pestalozzi, JOHANN HEINRICH, the celebrated educationalist, was born at Zürich, in Switzerland, on January 12th, 1746. After abandoning theology and jurisprudence in turn, he conceived the project of establishing himself in a country house in which he might receive and educate a few destitute children (1775). His farm at Neuhof near Lenzburg having failed, owing to his want of business capacity (1780), he betook himself to writing, and in 1787 published *Lienhardt und Gertrud*, in which are set forth his views concerning the moral reform of the poor. His school for deserted children established at Stanz in 1798, under the auspices of the Swiss Directory, had to be abandoned before it had lasted a year, mainly in consequence of the Napoleonic invasion. He afterwards became the master of an experimental school at Burgdorf, which he removed to Yverdon in 1805. Pestalozzi owed much to Rousseau, and may be regarded as the forerunner of Froebel. He laid great stress on the value of observation as a factor in education; the pupil must be induced to exercise his natural power of gaining an intuitive knowledge through the senses. Modern practice largely accepts this principle. He died at Brugg, Aargau, on February 17th, 1827.

Pesth, or more properly BUDAPEST, since in 1873 it has formed one municipality with Buda, the capital of Hungary and next to Vienna—from which it lies 140 miles S.E.—the largest city in Austria-Hungary. Pesth, which is comparatively modern, stands on the left bank of the Danube, Buda, which dates back to Roman days, on the right, the two towns being connected by several bridges. Beautifully situated, containing numerous magnificent buildings, frequented by many nationalities, the twin-city is perhaps the gayest and brightest town in Europe. Amongst the principal edifices in Pesth are the superb Houses of Parliament, the Palace of Justice, the Academy of Sciences, the University (established at Tyrnau in 1635; removed to Buda in 1777; transferred to Pesth in 1783; attended by 4,000 students), the National Museum, the Art Museum, the Rathhaus, the Opera House, and the Jewish Synagogue, besides the Botanic Gardens,

bounds, and it speedily left Buda in the rear. In the rising of 1848 Pesth became the seat of Hungarian activity, while the Austrians held the citadel of Buda, from which Pesth was bombarded with deadly effect. The twin-city, however, still warmly espouses the cause of Magyar aspirations. Pop. (1901), 733,358.

Petal (from the Greek *petalon*, “a leaf”), one of the leaves in the corolla, or inner whorl of the floral envelopes, among Angiosperms. It is generally attached by a narrow base, delicate in texture, and brightly-coloured; and is often odorous, colour and odour serving to attract insects or birds and so secure cross-pollination. This is the main object of the petal. In structure it corresponds to the blade of a foliage leaf, but is seldom pointed, and is sometimes contracted below into a narrow base or claw, as in the wallflower. Its



BUDAPEST

(Photo: Alois Beer, Blocksberg.)

the Agricultural Museum, and the Franz Josef and other quays, the favourite promenade of the pleasure-loving community. Buda contains the Royal Palace, and on the Blocksberg stands the citadel, in the church of which are preserved the Hungarian regalia and the hand of St. Stephen. Both towns are the headquarters of learned and scientific bodies, and both are well provided with delightful gardens, that on Margaret Island being especially fine. Among the industries are iron-works, machine-, railway-, waggon-, engine- and boiler-making, and the production of jewellery, cutlery, glass, porcelain and majolica. The neighbourhood produces corn, wine, wool, wood, and cattle. Indeed, as a distributing centre, the commerce of Budapest is scarcely inferior to its industrial importance. In the Middle Ages Buda was practically the capital of the country until it was captured, in 1527, by the Turks, who held it for more than 160 years. When they were compelled to withdraw Pesth was in a complete state of decay, but under the fostering care of Maria Theresa and Joseph II. it showed signs of returning animation and, during the 19th century, its prosperity advanced by leaps and

margin may be bifid, as in chickweed; fringed, as in pinks; or cut up (lacinate), as in the ragged robin.

Petalosticha, a term applied by Haeckel to one of his two divisions of the Echinoidea or Sea-urchins. It includes those in which the tube feet of one part of the ambulacra [ECHINOIDEA] are specialised to serve for respiration; this part of the ambulacrum is generally expanded and so described as petaloid. The group is, however, now broken up into three: the Clypeastroidea, Cassiduloidea, and Spatangioidea.

Petard, a 16th-century explosive instrument for destroying doors and other obstructions to the entry of a hostile force. It was generally formed of gun-metal, and took the form of a conical hat and contained from 7 to 20 lbs. of powder. It was fastened by means of a plank and fired by a slow-match. An excellent account of the petard and its action occurs in Sir Walter Scott's *Woodstock*, where it is employed by Cromwell against Sir Henry Lee's dwelling. The petard is now obsolete, as bags of powder and discs of gun-cotton are handier and

more effectual. When Shakespeare wrote (*Hamlet*, iii. 4)—

"For 'tis the sport to have the engineer
Hoist with his own petard,"

he meant to imply that the man was caught in his own trap, or involved in a danger intended for others. The phrase is still in common use in this sense.

Petchora, a river of Russia in Europe, rising in the north of the government of Perm, on the western slope of the Ural Mountains. It flows westwards then northwards into the government of Archangel, then westwards and northwards, falling by many mouths into the Arctic Ocean after a course of nearly 1,000 miles, for about 700 miles of which it is navigable. It receives on the right the Ilytch and Ussa and, on the left, the Kozhva, Izhma, and Pizhma, besides numerous smaller streams. It flows through a sparsely-populated, somewhat barren country, its banks being bordered for long stretches by dense forests while its scenery is extremely sombre.

Petechia, dark red or purple spots on the skin which do not yield to pressure and are caused by hemorrhage into the cutaneous tissues. They are most usually found on the back, trunk, about the elbow and in the groin. They are commonly symptomatic of the diseased state known as purpura.

Peter, ST., was the son of John (John i. 42; xxi. 15, 16), or Jonas (Matt. xvi. 17), and appears to have been born at Bethsaida (John i. 44). He was also called Symeon (Acts xv. 14), which is usually abbreviated to Simon. The name Cephas is merely a Hellenised form of the Aramaic Cepha, the meaning of which is the same as that of the Greek *petros*—viz., "stone." During the ministry of Jesus Peter was living in Capernaum with his brother Andrew, his wife's mother being another inmate of the house (Mark i. 29, 30). Before his call he was engaged in fishing, together with his brother and James and John, and to this occupation he returned after the Resurrection. Peter was conspicuous above the other disciples for his affectionate zeal, but his hasty words and actions called forth more than one rebuke from his Master (cf. Mark viii. 31-33; John xviii. 10, 11). The narrative, in John xviii., incidentally affords some interesting glimpses into his character, showing at once the genuineness of his love for Jesus and the tendency to moral cowardice against which that love was not proof. In his weakness, as in his strength, he was a special object of the Lord's regard (Luke xxii. 31, 32). Galatians i. 18 and other passages testify to the pre-eminent position he occupied at Jerusalem after the Ascension. He shared with St. Paul the work of extending the knowledge of Christ and laying the foundations of the Church; "the gospel of the uncircumcision," says Paul, "was committed unto me, as the gospel of the circumcision was unto Peter" (Gal. ii. 7). At the Council of Jerusalem he was foremost in acknowledging the claim of the Gentiles to the same spiritual privileges as the Jews (Acts xv. 7, *seq.*); yet his want of steadfastness on this point afterwards

involved him in a quarrel with St. Paul, which we may believe to have been only temporary (Gal. ii. 11-21). There is no further record of St. Peter; but, according to the ancient tradition of the Church, he was crucified at Rome, and the fact of his martyrdom is implied in John xxi. 18.

Peter, THE EPISTLES OF, are two, the first of which is generally admitted, from internal and external evidence, to be genuine, while the authenticity of the second has been doubted for several reasons, amongst others the absence of reference to it by the early Fathers, the marked difference of style, which resembles that of St. Jude, the paucity of allusions to incidents in the Saviour's life and sayings, silence on most of the cardinal points of Christian doctrine, and certain anachronisms that indicate not a Petrine authorship but composition in the 2nd century. One result of disputing its genuineness is to cast doubt on the Canon, to which it was admitted in 393. Its apologists say that the silence of the Fathers is not a convincing argument, and the difference of style may be owing to the employment of a secretary in its composition. Fragments of an apocryphal Gospel and Revelation of Peter were discovered at Akhimi in Egypt in 1886-7.

Peter I., ALEXEYEVICH, or THE GREAT, Tsar of Russia, was born at Moscow on June 11th, 1672. He succeeded his half-brother Feodore, son of the Tsar Alexis by his first wife, in 1682; but the intrigues of his sister Sophia, who excited a rising of the streltzi, or militia, compelled him to share the sovereignty with his brother Ivan, a weak and incompetent youth, Sophia herself acting as regent. The training he received from the Genoese Francis Lefort convinced him of the backward and uncivilised condition of Russia; and, after the death of Ivan in 1696—when Peter promptly revenged himself on Sophia by confining her for life in a convent, in which she died in 1704—he set to work to raise his country to the level of the other states of Europe. In the formation of an effective army and navy he was much assisted by the counsels of Lefort. The first step in furtherance of his great scheme—the acquirement of an extensive sea-board—was the capture of Azov from the Turks in 1696. Desirous of seeing lands more civilised than his own, he travelled in Prussia, Holland, and England (1697-8), setting out in the disguise of a member of the Russian embassy, and working for some time at Amsterdam, Zaandam, and Deptford as a common labourer in a shipyard. From London he went to Vienna to study the tactics of the imperial army, and was about to visit Italy when a fresh rising of the streltzi called him back to Russia. In 1700 he engaged in a war with Sweden, in which he was aided by Poland and Denmark. His forces suffered a terrible reverse at Narva (1700), and were defeated in many subsequent battles; but the victory of Pultowa (1709) compelled Charles XII. to seek refuge in Turkey, and in 1710 Peter gained possession of the Baltic provinces and part of Finland. Meanwhile he had founded the city of (St.) Petersburg (1703), which was to become the centre of the renovated empire. In 1711 he was

drawn into a disastrous war with Turkey, and was obliged to restore Azov as the price of peace. In this year he married Catherine I., his first wife (Eudoxia Lopukhin) having been divorced in 1696. A second tour in Europe, in which he was accompanied by the empress, was followed on their return by the trial and condemnation of his rebellious son Alexis, who favoured the reactionary party in Russia (1718). He is now known to have died in prison from the effects of repeated torture. The war with Sweden, in the course of which Peter gained many advantages, ended with the Peace of Nystad (1721), Sweden renouncing all claim to Livonia, Esthonia, Ingria, Carelia, Viborg, and the neighbouring islands. The Tsar died on January 28th, 1725. The character of Peter the Great presents an extraordinary combination of apparently



PETER THE GREAT.

(From the statue by Mierk Antokolsky.)

contradictory traits. A man of brutal passions and the lowest tastes, he nevertheless laid the foundations of Russia's greatness, not only by establishing her military and naval power and promoting foreign trade, but by his efforts to raise the tone of social intercourse, his zeal on behalf of education, and his encouragement of letters, science, and art. A so-called "will" of his, urging his successors to extend their empire—which has been the basis of much of the traditional fear of Russian advance—is generally supposed to be spurious and to have been the invention of Napoleon I. in order to excuse his war with Russia in 1812.

Peter II., ALEXEIEVICH, son of Alexis, the unfortunate son of Peter the Great, was born at St. Petersburg on October 22nd, 1715, and became Tsar of Russia on the death of Catherine I. in 1727. Being still a boy he was placed under the guardianship of Prince Menshikoff, who betrothed the young

emperor to his daughter Mary. The wily statesman, however, was outwitted by the Dolgoroukis, who prevailed upon Peter not only to exile the former favourite, but also to become affianced to Catherine, a princess of their own house. But this scheme, too, went "agley," for the young Tsar fell ill of small-pox and died on February 9th, 1730. He had been crowned at Moscow about two years before, and it was supposed this indicated a design to transfer the capital to the ancient city.

Peter III., FEODOROVICH, the son of the Duke of Holstein and Anna, daughter of Peter the Great, was born at Kiel on February 21st, 1728, his real name being Karl Peter Ulrich. He was named heir to the throne of Russia in 1742, and thereupon took up his residence in the country of which he was prospective ruler. In 1745 he married the Princess Sophia Augusta of Anhalt-Zerbst, who took the name of Catherine upon joining the Greek Church. The marriage proved a failure. On the death of the Tsarina Elizabeth in 1762 Peter ascended the throne (January 5th). His German predilection and reforming tendencies made him unpopular with the bureaucracy, and Catherine—threatened with divorce and incarceration in a convent—placed herself at the head of a plot and was crowned empress on July 8th. Thereupon Peter was seized, conveyed to Ropcha, where he was first compelled to abdicate, and was afterwards strangled by Orloff and other conspirators on July 17th, 1762.

Peter Martyr, a Dominican monk of Verona, who was a fanatical member of the Inquisition and carried out his duties with such ferocity that the people of Cono in their wrath put him to death in 1252. He thus came to be regarded, not inappropriately, as the patron-saint of the Inquisition. One of Titian's masterpieces, representing the tragedy of his death, was destroyed by fire in Venice in 1867.

Peter Martyr, whose real name was PIETRO MARTIRE VERMIGLIO, Reformer, was born at Florence on September 8th, 1500. Educated at Padua, he became a travelling preacher in 1526. At Bologna he learned Hebrew, and in Naples he met Bernardino Ochino. His sympathy with the doctrines of the Reformers compelled him in 1542 to leave Lucca, where he was prior of San Frediano, and seek refuge in Switzerland. After holding a professorship at Strasburg he went to England in 1547, and took an active part in establishing Protestantism in that country under Edward VI., becoming a Professor of Exegesis at Oxford. On the accession of Mary he returned to Strasburg, and in 1555 settled in Zürich, where he died on November 12th, 1562. The epithet "Martyr" must probably be explained as a sympathetic allusion to his enforced exile from his native land.

Peter the Hermit, the preacher of the First Crusade, was born of a good family at Amiens about 1050. In his youth he served as an officer under the Count of Boulogne. After his wife's death he became a monk, and finally retired to a hermitage. The statement that his zeal on behalf of the Crusade was inspired by a visit to Palestine

about 1093 is now denied by competent authorities. It is even said that his share in the enterprise was confined to the part he played as leader of the first irregular body of some 10,000 men. He did not distinguish himself at the siege of Antioch (1097), where force was required to prevent him from fleeing from the camp. He died in a monastery founded by himself at Huy near Liège, on July 7th, 1115.

Peter's Pence, a tribute paid by England to Rome from the Anglo-Saxon period down to the Reformation. It was founded by Ina of Wessex in 721, probably for the support of an English college at Rome, and was confirmed in 790 by Offa of Mercia. It amounted to one penny per household, and was paid first as an alms, then as customary, and finally as a tax on pain of ecclesiastical censure. The tax was abolished by Henry VIII. The effort to extend a similar tribute to other countries in Europe was only partially successful and payments

Peterborough, a city, mostly in Northamptonshire but partly in Huntingdonshire, England, on the Nen, 75 miles N. by W. of London. It is situated in an agricultural district, and has large corn and stock markets. It is a very important railway centre, and the manufacture of agricultural implements is the leading industry, while brick-making is conducted on a remarkable scale in the vicinity. The principal public buildings are the town hall, corn exchange, library and school of art. Scholastic institutions are represented by the grammar school and the training college for schoolmasters. The Perpendicular parish church of St. John and the episcopal palace are also notable edifices, but the glory of Peterborough is its cathedral. The first structure, founded in 655 by Peada of Mercia, was destroyed in 870 by the Danes; and the second, after being enriched by Edgar and receiving the name of Goldenborough, was burnt in 1116. The existing cathedral occupied some 400 years in the building, and shows Norman,



PETERBOROUGH CATHEDRAL: WEST FRONT.

ceased after the Reformation. The gifts now sent to the Pope under the style of Peter's pence are freewill contributions—in which poor as well as wealthy take part—of Roman Catholics throughout the world to replenish the papal exchequer, which is supposed to have suffered serious diminution of income since 1860, the date of the unification of Italy, and 1870, when the province of Rome was annexed to the Kingdom.

Early English, Decorated, and Perpendicular features. The Early English west front has three pointed arches 80 feet high, with pediment and pinnacles, the whole façade, which displays singular beauty, forming a square of 150 feet each way. The cathedral was thoroughly overhauled in the close of the 19th century. Katharine of Aragon was buried in it, and there are some interesting remains in the precincts. Pop. (1901), 80,870.

Peterborough, CHARLES MORDAUNT, THIRD EARL OF, was born in 1658. He was the eldest son of the first Viscount Mordaunt, whom he succeeded in 1675, and was educated at Eton and Christ Church, Oxford. Between 1674 and 1680 he took part in several naval expeditions to the Mediterranean. On his return he attached himself to the Whigs, and afterwards resisted the early aggressions of James II. with so much boldness that he was forced to withdraw to Holland. After the Revolution, in which he took a prominent part, his services were rewarded with the title of Earl of Monmouth and the office of First Commissioner of the Treasury, which he held for a year. His failure to ruin the Earl of Nottingham and other political opponents by means of Sir John Fenwick's confessions (1697) was followed by his temporary withdrawal from public life. In the same year he succeeded his uncle as Earl of Peterborough. In 1705 he was sent to Spain as sole commander of the land forces and commander of the fleet in conjunction with Sir Cloudesley Shovell. His extraordinary feats in this campaign have made his name renowned in history. A night attack on the fortress of Montjuich on the south side of Barcelona resulted in the capture of the citadel (September 17th), which was followed four weeks later by that of the town itself. Catalonia acknowledged the Archduke Charles, and Peterborough pressed forward into Valencia, receiving the submission of town after town as he advanced. Meanwhile the Archduke had been surrounded at Barcelona, the Duke of Anjou and Marshal Tessé investing the city by land, whilst the Count of Toulouse blockaded it by sea. He was only saved by the audacity of Peterborough, who, putting out to sea in an open boat in search of the English fleet which he believed to be approaching, returned on its flag-ship in time to force both Tessé and Toulouse to retire. The conduct of the Archduke, who persistently disregarded his advice, neglecting several opportunities of marching at once on Madrid, as well as his own jealousy of his fellow commander Galway, led to Peterborough's retirement from the war in 1707. On his return to England he joined the Tories, by whom he was sent on several diplomatic missions. His love of intrigue, however, always hindered his advance in the public service, and during the last twenty years of his life he saw less of statesmanship and diplomacy (for which his hot and haughty temper disqualified him) than of the brilliant literary circle which included among its members Swift, Atterbury, and Pope. He died at Lisbon on October 25th, 1735.

Peterhead, a seaport of Aberdeenshire, Scotland, 33 miles N.N.E. of Aberdeen. The principal buildings include the Town Hall, with a granite spire 125 feet high, the Arbuthnot Museum of natural history and other specimens, the Academy, the parish church and the convict prison. The town is largely built of the pinkish granite for which the district is famed. The industries include woollens, ship-building, granite-quarrying and polishing, and, above all, fishing, although the seal and whale fisheries are extinct. An enormous harbour of refuge,

from designs by Sir John Coope, is in process of construction, and is expected to be completed by 1921 at a cost approximating £1,000,000. Till the forfeiture of the earldom in 1715 the Keiths, Earls Marischal, were the overlords. The Old Pretender landed at Peterhead in that year and was proclaimed king at the market cross. Of Marshal Keith (1696-1758), Frederick the Great's right-hand man, there is a bronze statue, presented to the town in 1868 by William I. King of Prussia. Pop. (1901), 11,763.

Peterhof, a town of Russia in Europe, on the southern shore of the Gulf of Finland, 18 miles W. of St. Petersburg. It is almost wholly a residential quarter, and has sprung up in the vicinity of the palace which was built in 1711 by Peter the Great. The magnificent gardens have been laid out after the style of those at Versailles, and the mansion contains a fine picture gallery. The palace is a favourite summer retreat of the Tsar. A series of splendid gardens connects Peterhof with Oranienbaum on the west and Strelma on the east. Pop., 14,000.

Peterloo (named in imitation of Waterloo, its real name being St. Peter's Field), Manchester, was the scene of a meeting in favour of Parliamentary Reform, August 16th, 1819, presided over by Henry Hunt, commonly called "Orator" Hunt. The yeomanry, summoned by the magistrates to disperse the mob, killed eight of the rioters and wounded many others.

Petersburg, popularly but erroneously called St. Petersburg, founded by Peter the Great, and now the capital of Russia—though efforts have been made to choose some other capital—is built on the delta of the Neva, part of the town being on the land between the main stream and branches, part on the northern bank, and part on islands. Many bridges join the different portions of the city, which is connected by railway with most of the principal towns of Russia and the European system. The land is low, damp, and marshy, and subject to periodical inundations, and the alternating wet and frost quickly destroy the buildings and monuments. The Neva is frozen for five months of the year, and the winter cold is intense. Of the several districts of the city, one of the finest is the Admiralty, and Vassilievskoi contains most of the literary and scientific institutions. On some of the islands are many summer-houses and gardens. The most striking features of the city are its gilded domes, magnificent palaces, long, wide streets—the Nevski Prospekt, for instance, being three miles long and 130 feet wide—extensive squares, colossal buildings and granite quays. Owing to its size, Petersburg seems thinly inhabited, save in the lively southern quarter, the Admiralty Square, the Summer Garden, and the Neva quays. Of the many churches, mostly Orthodox, that of St. Isaac, built (1819-58) on piles, and constantly undergoing repairs through the ravages of the climate, is of Finland granite and marble, and has the form of a Greek Cross. It possesses fine peristyles, with 112 pillars, each 60 feet in

height. In the centre rises a gilded dome on granite pillars, the height to the top of the cross being 336 feet. The interior is richly adorned with precious stones, gold, silver, bronze and marble. The church of SS. Peter and Paul, in the fortress, is the burial-place of the emperors. The cathedral of Our Lady of Kazan contains a statue with ornamentation to the value of £14,000, and another cathedral is of white marble. Among the dozen imperial palaces are the old palace of St. Michael, now a military engineering school, the new palace of St. Michael, the Winter Palace on the Neva (used for court ceremonial, and containing beautiful rooms, as well as being the storehouse of the crown

scenes which the capital has witnessed in connection with the political troubles with which it always seethes, the most dramatic was that witnessed on January 22nd, 1905, when a gigantic but peaceful procession of strikers, headed by Father Gapon, was fired on by the military when on its way to present a petition to the Tsar at the Winter Palace. Pop. estimated 1,487,720.

Petersburg, a city of Virginia, United States, on the right bank of the Appomattox, 22 miles S. of Richmond. The falls of the river provide ample power for the industries. The manufactures include those of tobacco, cotton, silk, machinery,



THE NEVSKI PROSPEKT, PETERSBURG.

jewels), and the Hermitage Palace (containing a remarkable collection of pictures). Among other monuments and buildings may be mentioned the bronze equestrian statue of Peter the Great—a masterly work by Étienne Maurice Falconet (1716-91); a column 80 feet high in memory of Alexander I.; statues of Catherine II. and of Nicholas; the monument of the Russo-Turkish War; the Admiralty (with naval museum); the Arsenal (with artillery museum); the Palace of the Senate; the Academy of Sciences (with museum); the University, and the Imperial Library, many of the contents of which are plunder from Poland. A deep channel connects the city with the protecting fort of Cronstadt. Petersburg is a great manufacturing centre, the chief objects of industry being iron-founding, the construction of machines, glass-making, tanning and brewing, and manufactures of sugar, cotton, and tobacco, and there is a Government tapestry factory. The shipping is very considerable, and the trans-Russian trade *via* the Neva and the interior canals is of immense importance. Peter the Great began building the city in 1703 on territory taken from Sweden, and many lives were lost during its creation. Of the many turbulent

flour, paper and agricultural implements. It is the seat of the Southern Female College, the Virginia Normal and Collegiate Institute, the University School and the Court-house. In the Civil War it was besieged by the Federals from June, 1864, to April 3rd, 1865. Pop. (1900), 21,810.

Peter the Wild Boy was discovered in a wood near Hameln, 25 miles south-west of Hanover, in 1724, behaving in every respect just as an animal. George I. sent him to London in 1726 and entrusted him to Dr. Arbuthnot, who had him named Peter. He liked music, but could scarcely articulate, the nearest approach to words he ever reached being his own name "Peter," "Ki Sho" for "King George," "Qui Ca" for "Queen Caroline" and "Hom Hen" for "Tom Fen," the name of the farmer in Berkhamstead, Hertfordshire, with whom he lived latterly. He was so addicted to roaming that he had to wear a collar engraved with his name and address. Lord Monboddio visited him in 1782 and described him in his *Origin and Progress of Language*. Peter died in August, 1785, pining away and refusing food after the farmer's death—also an attribute of some animals.

Pétion de Villeneuve, JÉRÔME, revolution-ary, was born at Chartres, department Eure-et-Loir, France, on January 3rd, 1756, and practised as an advocate in his native town. On the summoning of the States-General (1789) he was elected deputy by the Tiers État of Chartres, and in December, 1790, became president of the Constituent Assembly. Along with La Tour Maubourg and Barnave he was despatched to Varennes (June 22nd, 1791), to bring back the unhappy king and queen after their bungled attempted flight. In November, 1791, he succeeded Bailly as mayor of Paris. In the Convention, of which he was the first president, he associated himself with the Girondists, joined in the attack on Robespierre in April, 1793, and was one of the twenty-two members proscribed in the following June. With several others of the party he escaped into Normandy, fled thence by sea to the Gironde, and lay concealed in a cave at St. Émilion, till the fear of discovery drove him and his companions to seek a new refuge. The bodies of Pétion and Buzot were found in a field half-devoured by wolves. The date of his death has obviously never been ascertained.

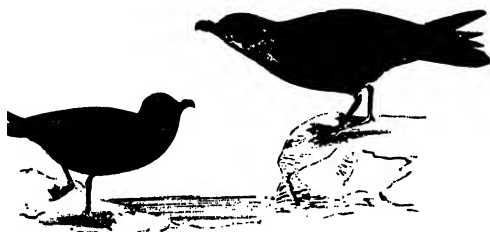
Petition of Right, (1) in law, is a petition on the part of the subject for the restitution of rights of which he has been deprived by the Crown. (2) In English history it denotes a petition presented to Charles I. by the Commons in 1628, which became law by force of the king's consent. It aimed at the abolition of certain generally recognised grievances—e.g., taxing without consent of Parliament, raising money contrary to law, arbitrary imprisonment, imprisonment without cause shown, billeting of troops, and use of martial law in time of peace.

Petra, a now ruined city, once capital of Arabia Petrea, situate in a narrow river valley surrounded by hills, 110 miles S. by E. of Jerusalem. It was the capital of Edom and was situated by the Wady-el-Arabah, five days' journey from the Gulf of Akabah, and six days' journey from the Dead Sea by the same route. In the Bible it is spoken of as Selah and Joktheel, and is also mentioned by Strabo (who described it as the metropolis of the Nabataeans), Pliny, and other writers, including Josephus, and must therefore have been of considerable importance. After the fall of the Roman empire the place gradually passed into decay, the haunt of the Bedouin and the jackal. Among the most important remains are rock temples, a ruined palace 34 yards square, with colonnades, cornice, and an arch 35 feet high leading into one of three large rooms, a theatre capable of holding 4,000 people, and a treasure house.

Petrarch, FRANCESCO PETRARCA, famous both as a lyrical poet of the first rank and as one of the earliest and most influential promoters of the revival of learning in Europe, was born on July 20th, 1304, at Arezzo, in Tuscany, Italy, where his father, a Ghibelline notary of Florence, had taken up his abode when driven from his native town. In 1313 the household removed to Avignon, which

a few years earlier had become the seat of the Papal court. In accordance with his father's wishes, he studied jurisprudence at Montpellier and Bologna; but the fascination of Virgil and Cicero drew his mind wholly away from the law. After his father's death, in 1326, poverty compelled him to take orders. His first meeting with Laura took place in the church of St. Clara at Avignon on April 6th, 1327. She at once became the object of a deep but hopeless passion, which did not lose its hold over him during the remainder of his life. It is said that Laura was the daughter of Audibert de Noves, and that she had recently been married to Hugh de Sade; but this tradition rests on very slender evidence. After travelling through France and Germany in search of classical MSS., he, in 1337, retired to the secluded valley of Vaucluse, where he occupied himself with his Latin epic *Africa*. His reputation reached its height in 1341, when he received the poet's laurel crown on the Roman Capitol. He now became a welcome guest at the courts of princes, and was often employed as an ambassador. Robert of Anjou, King of Naples, had been one of his earliest and most ardent admirers; and, in spite of his republican principles, the despots of North Italy vied with one another in showing him honour. His friendship with Boccaccio, probably formed about 1343, is a matter of much importance in literary history, for it led to a renewal of the study of Greek. In 1345 occurred the most famous of his discoveries—that of the MS. of Cicero's letters at Verona. With keenest interest he followed Rienzi's abortive attempt at revolution in 1347, and in the autumn of this year he went to Parma to reside. However, a deep change was soon to come over his life, for the Plague carried off Laura (April 6th, 1348) and many friends. Through the good offices of Boccaccio he was invited to become rector of the University of Florence, and he was also offered the restoration of his civic rights and his patrimony (1351). These temptations he resisted in favour of the simple life of the scholar at Vaucluse. Yet occasionally he had to participate in public affairs. He undertook a mission from Genoa intended to close the long strife with Venice, and delivered to no purpose a striking oration before the Doge Andrea Dandolo. At Milan he frequently served the Visconti in a diplomatic capacity, and had even to visit Prague and Paris officially. As years passed he devoted himself more closely to the dead languages. He settled at Padua in 1362, and passed the remainder of his life in the immediate neighbourhood, dying at Arquà in the Euganean Hills on July 18th, 1374. Petrarch's fame now rests mainly on his *Canzoniere*, a collection of exquisitely harmonious lyrics, in which every thought and emotion prompted by his love for Laura is presented with a directness and simplicity unknown to the earlier love-poets of the Middle Ages. His Latin works are numerous, including *Africa* (an epic on the Second Punic War), *Eclogues* and *Epistles* in verse, various dialogues and philosophical treatises, and an important collection of *Letters*, which, by good fortune, afford abundant information concerning the details of his life.

Petrel, a bird belonging to the widely-distributed genus *Procellaria*, the number of species of which differs in various classifications. They are small oceanic birds of dusky plumage, rarely visiting land, except to breed, and seemingly delighting in storm, whence sailors consider them birds of ill omen. They have great powers of flight; the hind toe is rudimentary, and the nostrils, as in all the group (*Tubinarea*), are tubular. The best-known species, the Stormy Petrel (*P. pelagica*), resembles a swift in general appearance, and is sooty-black in colour, with some white on the wings and tail. The



PETRELS
(*Procellaria pelagica*).

name Petrel (= "little Peter") refers to the action of these birds, which often hover just above the surface, as if walking on the water.

Petrie, WILLIAM MATTHEW FLINDERS, Egyptologist, was born at Charlton, Kent, England, on June 3rd, 1853. His mother was a daughter of Captain Matthew Flinders (1774-1814), the Australian explorer. He was educated privately and began his career by investigating the ancient remains in England, his work on *Stonhenge* appearing in 1880. For the next quarter of a century he was engaged in excavating in Egypt and made many discoveries as important as they were interesting. His principal work in this respect embraced the finding of the Greek towns of Naukratis (1885) and Daphnia (1886), prehistoric Egyptian settlements at Koptos (1891) and Nagada (1895), the explorations at Thebes (1896) including the inscription of the Israelite war; and his elucidation of the kings of the earliest dynasties at Abydos (1898). In addition to the extremely valuable books in which he recorded at length the results of these labours, he also wrote works on *Racial Portraits* (1888), *Historical Scarabs* (1889), *Medum* (1892), *Ten Years' Diggings in Egypt* (1893), *History of Egypt* (1894-1905), *Tell el Amarna* (1895), *Religion and Conscience in Ancient Egypt* (1898), *Diospolis* (1901), and *Methods and Aims in Archaeology* (1904). In 1892 he was appointed Edwards professor of Egyptology in University College, London.

Petroleum, an inflammable liquid which occurs naturally in the earth in various localities in Central and other parts of Europe, the Caucasus, Canada, and the United States. Such liquids have been known from early times, and were employed by the Chinese at a very remote period, while mention of them is also made by

several of the classical writers. The liquid is usually obtained from its sources by boring deep wells or bore-holes. In some cases the petroleum is forced up by natural pressure, and issues in a jet at the top of the bore-hole. Usually, however, the pressure soon sinks and the petroleum has to be pumped out artificially. The chief sources now are in the United States, notably in Pennsylvania, where the industry developed very rapidly from 1861 to 1865, when to "strike oil" was to become wealthy beyond the dreams of avarice, Ohio and West Virginia, and the Apsheron district in the West Caucasus of which Baku is the port. The output in Roumania, Galicia and Alsace is also of growing importance. Chemically petroleum consists chiefly of a mixture of hydrocarbons of the series known as the paraffins. Other compounds of carbon and hydrogen are, however, frequently present. The crude liquor is purified by careful distillation. As obtained it has a specific gravity of about .75. When it is distilled, portions are separately collected—first, those portions that boil over below 65° Fahr. with specific gravity .62, then those that boil between 65° and 100°, having a specific gravity of about .66, etc. In this way a number of separate fractions are obtained known under the names of rhigolene, gasolene, naphtha, etc. The lower boiling portions are not much used as illuminants, but are very largely employed as solvents for gums, caoutchouc, etc. The intermediate portions are largely used for illumination and fuels, the highest portions as fuels and lubricants, while a quantity solidifies on cooling, yielding solid paraffin. In the use of petroleum in household lighting it is important to distinguish between the American oil with a flash-point of 110° F. and the Russian with a flash-point of 83° F. A refined petroleum, known as petrol, is very generally employed in the running of motor-cars.

Petronius, surnamed ARBITER, because of his skill as a literary "taster" of what was light, airy and elegant, was a Roman satirist concerning whose personality nothing is known. It is conjectured that he is identical with the Caius Petronius mentioned by Tacitus, a courtly and profligate favourite of Nero, who was banished through the intrigues of Tigellinus, and committed suicide by opening his veins. According to this theory he must have flourished in the middle of the first century of the Christian era. The fragments of his *Satires* which remain give a vivid but repulsive picture of contemporary social life.

Petropavlovsk, the capital of Kamchatka, a peninsula in the north-east of Asia, an important seaport situated on the bay of Avatcha, on the east coast. It has a capacious harbour, but the town has only a few hundred inhabitants. There are monuments to Bering and La Pérouse.

Petropavlovsk, a town of the province of Akmolinsk, West Siberia, on the Ishim, about 200 miles S. of Tobolsk. Owing to its situation it carries on a large trade with the Kirghiz, Bokhara, Khiva, and Turkestan. It has manufactures of leather, soap, glue and tallow. A rude fortress

was constructed in 1752 which sufficed to hold the surrounding peoples in check. The town was almost burnt down in 1879. Pop. (estimated), 21,000.

Pettenkofer's Test for the presence of bile salts consists in the addition to the suspected liquid of a drop of a strong solution of cane sugar and then of sulphuric acid. If bile salts are present a bright cherry-red colour is developed. It was named after its deviser, Max von Pettenkofer (1818-1901), for many years Professor of Chemistry at Munich, and author of *Handbuch der Hygiene* (1882).

Pettie, JOHN, painter, was born in Edinburgh on March 17th, 1839, and entered the Trustees' Academy, then under Robert Scott Lauder, at the age of seventeen. Among his fellow-students were W. Q. Orchardson, J. MacWhirter, W. McTaggart, Peter Graham, Tom Graham, and George Paul Chalmers, who all became noted artists. He first exhibited at the Royal Scottish Academy in 1859,



THE VIGIL.

(From the painting by John Pettie, R.A.)

and at the Royal Academy in 1860, and settled in London in 1862. He was elected A.R.A. in 1866, and R.A. in 1873, in succession to Sir Edwin Landseer. He showed equal power in portraiture, historical subjects and *genre* with a dash of humour. Among his best works were "The Drumhead Court-Martial" (1865), "An Arrest for Witchcraft" (1866), "Hal o' the Wynd" (1874), "The Sword and Dagger Fight" (1877), "The Death Warrant" (1879), "The Vigil" (1884), bought by the Chantrey Trustees and now in the Tate Gallery, "The Chieftain's Candlesticks" (1886), "Two Strings to her Bow" (1887), "The Ultimatum" (1892), and his diploma picture, "Jacobites, 1745." His handling was spontaneous and forcible, his colour strong and his composition always happy. He died at Hastings on February 21st, 1893. His only child married Hamish MacCunn (b. 1868), the composer.

Pettigrew, JAMES BELL (1834-1908). Physiologist, born at Roxhill, Lanarkshire, Scotland, was educated at Airdrie Academy and the Universities of Glasgow and Edinburgh, at the latter of which he studied medicine, taking the gold medals in anatomy and medical jurisprudence and also for his thesis. In 1860 he was appointed Croonian Lecturer to the Royal Society and President of the Royal Medical Society. From 1862 to 1868 he was Assistant-curator of the Hunterian Museum in London, becoming Curator of the Museum of the Royal College of Surgeons, Edinburgh, in 1869. In 1873 he was made lecturer and examiner in physiology to the Royal College of Physicians and Surgeons, Edinburgh, and, in 1875, was elected to the Chandos Chair of Medicine and Anatomy in the University of St. Andrews. He devoted many years of research to the subject of the mechanism of flight and other means of locomotion in animals, and contributed to the International Science Series the volume on *Animal Locomotion* (1873). The greatest of his works is *Design in Nature*. He was awarded, in 1874, the Godard prize of the French Institute, became F.R.S. in 1888, and was Laureate of the Institute of France, M.D. of Edinburgh and LL.D.

Petty, SIR WILLIAM, political economist, was born at Rousey, Hampshire, England, on May 26th, 1623. He studied at several foreign universities, and in 1651 was appointed professor of anatomy at Oxford and afterwards of music at Gresham College. In 1652 he went to Ireland as physician to the army, and in 1654-55 completed a new survey of the Irish estates forfeited in 1641. This was the first attempt to carry out a survey scientifically on a large scale, and the map of Ireland which he afterwards constructed was described by John Evelyn as the most exact which had yet appeared. He was made surveyor-general of the island by Charles II. On the occasion of the incorporation of the Royal Society (April 22nd, 1662), of which he was an original member, he was knighted. A man of an ingenious turn of mind, he invented a land-carriage, attempted to furnish ships with a propelling engine, devised "a wheel to ride upon," thus anticipating the cycle, and built a double-bottomed ship which sailed successfully from Dublin to Holyhead. He twice refused a peerage. In his latter years his ceaseless strivings after reforms of all sorts raised up a host of enemies, but he nevertheless became a Commissioner of the Navy, a post which he filled with exceptional ability. He was one of the forerunners of Adam Smith and his writings on political economy were of great importance, amongst them being *A Treatise on Taxes and Contributions* (1662), *The Political Anatomy of*

Ireland (1672), and *Political Arithmetick* (1690). He died in London on December 16th, 1687.

Petty Officers, a superior class of seamen in the Royal Navy, the first definition of whose position is given in the Regulations of 1808. Their rank is similar to that of the non-commissioned officers in the army. Being highly trained they are responsible for the conduct and efficiency of the ship's company, and from their ranks all warrant officers are drawn. They are of four classes—Chief petty officers; first and second class petty officers; and leading seamen. And they are further divided into two branches, seamen and non-combatants. Chief petty officers can only be disrated (reduced) with the Commander-in-chief's sanction and the disrating of a chief engine-room artificer must be reported to the Admiralty, by whose order alone his rank can be restored. Petty officers of lower rank are appointed and can be disrated by the captain of the vessel, excepting gunnery or torpedo instructors. The pay ranges from 2s. 4d. a day for a leading seaman to 7s. 6d. a day for a chief engine-room artificer, with an extra penny for each good-conduct badge.

Petunia, a genus of South American Solanaceæ, closely allied to the tobacco, *petun* being the Brazilian name for tobacco. They have sticky leaves; pentamerous bicarpellate flowers with a trumpet-shaped corolla, unequal included stamens, and one style; and a many-seeded capsule. Several species and hybrids, with flowers of many beautiful colours, are grown in gardens. They have been specially cultivated with such success that the double-flowered varieties are stronger and more lasting than the single-flowered.

Petunzite, CHINA-STONE, GROWAN, or MOOR-STONE, names (the first from the Chinese *petuntze*, the others used in Cornwall) for the decomposed granite, free from tourmaline and black mica, to which porcelain owes its "flesh" or translucency.

Petworth, the "Peteorde" of Domesday Book, a town of Sussex, England, 14 miles N.E. of Chichester. The chief structures are the Decorated church of St. Mary; the Town Hall, market-house and court-room in a block of buildings in the centre of the town; the Petworth Institute, and Somerset Hospital, one of several charities. There are many picturesque examples of the domestic architecture of the 16th and 17th centuries. Petworth marble, a limestone of the Wealden, is quarried in the neighbourhood. Moore, in the vicinity, the ancient home of the Dawtreys, though converted into a farmhouse, still preserves some of its old features, including an oak-panelled room and a fine mantelpiece dated 1580. Petworth House, the seat of

Lord Leonfield, has some beautiful pictures and sculpture and a collection of wood-carving by Grinling Gibbons. The superb park was a favourite haunt of J. M. W. Turner, who was a frequent visitor when painting here and in the locality. Pop. (1901), 2,942.

Pevensey, a village of Sussex, England, 13 miles W. of Hastings. Large numbers of cattle are pastured in the neighbourhood and there are many nurseries and fruit gardens. The church of St. Nicholas is a fine example of Early English, and the old timber-fronted Court Hall is in good preservation. Pevensey is supposed to be the Roman station of Anderida and is famous for its castle, a stately and impressive ruin. It occupies



RUINS OF PEVENSEY CASTLE.

the site of a Roman fortress and the outer walls are almost wholly Roman. They enclose an area of eight acres, within which stands another quadrangular stronghold which is moated on the north and west. The eastern wall serves for both fortifications and is built upon a low platform of rock. Attacked by William Rufus and later by the younger Simon de Montfort (1264-5), it began to decay from neglect after the reign of Henry III., though Lady Jane Pelham defended it with conspicuous gallantry in 1339 against the followers of Richard II. Pevensey is the point from which Hæstmonceaux Castle is usually visited and the bay still displays an array of martello towers which, in Lord Palmerston's time, were the favourite form of coast defence. Pevensey is reputed to be the spot where William the Conqueror landed (or tripped and fell) on September 29th, 1066. Andrew Borde or Boorde, Henry VIII.'s physician, is said by some writers to have been born at Pevensey, though the balance of evidence is in favour of Cuckfield, Sussex. Pop. (1901), 365.

